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Ethics Through Legislation—*Weeks*
Anatomic Teeth—*Phillips*
Surgery and Prosthetic Dentures—*Kazanjian*
Anomalies of Edentulous Jaws—*Schlosser*
Hypersensitive Dentin—*Grossman*
Treatment for Reattachment—*Leonard*
Trend in Orthodontia—*Hoffman*
Dentures of Removable Type—*Elliott*
Affiliation with Bureau of Standards—*Volland*
Research at Bureau of Standards
Quo Vadis Dentistry?—*Purcell*
Azochloramid—*Ross*
Surgical Elimination of Periapical Pathosis—*Levine*

EDITORIALS

Agranulocytosis—Pacific Coast Conference—Dental Writing

COUNCIL ON DENTAL THERAPEUTICS

Azochloramid
Accepted Dental Remedies

BUREAU OF PUBLIC RELATIONS

Orthodontic Needs—*Hoffman*
Dental Economics

FIFTY CENTS

CONTENTS

Municipal Auditorium, Long Beach, Calif. ..... Frontispiece

ORIGINAL COMMUNICATIONS

Ethics Enforced Through Legislation.
By Arthur F. Weeks, D.M.D., F.A.C.D. 551
Are Anatomic Teeth Suited for Full Dentures?
By George P. Phillips, A.B., D.M.D. 559
Surgery as an Aid to More Efficient Service with Prosthetic Dentures.
By V. H. Kazanjian, D.M.D., M.D., F.A.C.S. 566
Clinical Prosthesis as Applied in Cases of Anomalies of Edentulous Jaws.
By R. O. Schlosser, D.D.S., F.A.C.D. 582
A Systematic Method for the Treatment of Hypersensitive Dentin.
By Louis I. Grossman, D.D.S., Dr. med. dent. (Rostock) 592
Periodontia Treatment for Maximum Reattachment.
By Harold J. Leonard, D.D.S., B.A. 602
The Trend in Orthodontia.
By Abram Hoffman, D.D.S., F.A.C.D. 607
Practical Partial Dentures of the Removable Type.
By F. C. Elliott, Ph.G., D.D.S. 614
The American Dental Association's Affiliation with the National Bureau of Standards.
By R. H. Volland, D.D.S. 618
Dental Research at the National Bureau of Standards 625
Quo Vadis Dentistry?
By T. E. Purcell, D.D.S. 628
Quo Vadis Dentistry?—The Answer.
By T. E. Purcell, D.D.S. 631
Proceedings of the Fourth General Meeting of the American Association of Dental Editors 633
Azochloramid in Root Canal Antisepsis.
By H. J. Ross, D.D.S. 637
Surgical Elimination of Periapical Pathosis Without Extraction of Involved Teeth.
By Julius H. Levine, D.M.D. 646

EDITORIAL DEPARTMENT

Agranulocytosis.—The Pacific Coast Dental Conference.—A Persistent Misconception About Hunter and the Subject of Focal Infection.—Dental Writing. 655-663

Practice in Paragraphs 664

COUNCIL ON DENTAL THERAPEUTICS

Azochloramid 666
Accepted Dental Remedies 668
Vita-Cell—Not Acceptable for A.D.R. 670
More Misbranded Dental Nostrums 672

BUREAU OF PUBLIC RELATIONS

Incipient Orthodontic Needs.
By Henry F. Hoffman, D.D.S., F.A.C.D. 680
A City Dental Health Program.
By E. H. Jones, D.D.S. 689
Pyorrhea 695
Dental Economics 698

CURRENT LITERATURE

Abstracts 704

NEWS

State, General and Foreign News 715

MISCELLANY

Book Reviews 718
Correspondence 719
"Immunize Now!" 720

Announcements 722

ADVERTISEMENTS

Index to Advertisements A-43
Classified Section A-34

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Original Communications

ETHICS ENFORCED THROUGH LEGISLATION*

By ARTHUR F. WEEKS, D.M.D., F.A.C.D., Portland, Ore.

THE recent enactment of laws regulating professional conduct by dentists has caused a great deal of comment. The fact that under some of these laws dentists may be disciplined for acts that formerly were considered only violations of the code of ethics has given opportunity for those opposed to any regulation, either through legislation or voluntary codes, to make many misleading statements, which, if not properly answered, are accepted as facts by a large part of the public, including many people of more than average intelligence. Quite naturally, the ones whose habits have been restricted by these regulations are disgruntled and would create the impression that the laws were railroaded into existence by a clique, who, for selfish reasons, would put them out of business. They assert that they have a constitutional right to advertise their services in any way they please and would have the public believe that it is being deprived of the right to know where dentistry may be obtained at bargain counter prices.

These and similar thoughts are suggested through advertising, and there is very little done in an organized way to counteract the false impression given. Even in private conversation, many professional men have difficulty in explaining clearly the reasons and justification for laws of this kind. Many of us, if called on to do so, have difficulty in telling why the code of ethics is the foundation of dentistry as an honorable profession, and in upholding the propriety of seeking laws to enforce certain sections of it. Consequently, the purpose here will be to consider the whole subject, not with the idea of bringing out any new doctrine, but of focusing attention on some age-old principles, which, because of a lack of vigorous preaching, are found neglected and almost dishonored.

In considering this matter, we should keep in mind the meaning of the word ethics, which by reference to any dictionary or encyclopedia is found to be

*Read before the Portland Academy of Dentistry, Portland, Ore., Jan. 7, 1935.

the study of morals and morality. The recognition of a moral duty whether it is called ethics, morality or just common honesty is so nearly universal that argument is superfluous, and it is only those denying the existence of these obligations that belittle the word ethics. Let us see, if we can, why codes of ethics are proper and why portions of them are properly made law.

THE FIRST CODE OF ETHICS

From the beginning of time, people have been governed by a code of some form. Immediately after the creation, commands were given for the regulation of the inhabitants of the earth, and violations of them brought penalties. Later, from Mount Sinai, there came a series of "thou shalts" and "thou shalt nots." There was no civil authority to enforce the provisions of the ten commandments, but so fundamental in the conception of right, or ethics, were they that they have endured through the ages.

As the inhabitants of the earth multiplied and problems of human rights arose, it was found that there were people who would not obey these commands unless compelled to and punished for violation, and it was found necessary to organize for protection. From this moment, all civilized units of society have been governed by two codes, the civil code, or laws made by themselves, and the moral code, or those handed down by tradition. The observance of one is compulsory and of the other is optional. Violation of one brings penalties in the way of loss of privileges, liberty or money, while violation of the other brings penalties in the loss of respect and confidence, although the violator may so far as civil law goes be considered law abiding.

Nearly two thousand years ago, we had a statement given us that is repeated until this day. It is a summary of all commandments and states that there are two commands "upon which hang all the law and all the prophets." The first is a command to respect and worship the creator, and the second is to "love thy neighbor as thyself." It requires but little analysis to see the two aims of all law—one regarding the recognition of the Deity and one regarding one's relations with his fellow man. In nearly all places, the first is optional and there is no attempt made to enforce it by statute, but acts violating the latter have been incorporated in civil codes and observance made compulsory. In examining civil law, every statute that has been tested may be traced more or less directly to those "thou shalt nots" that refer to one's relations to his fellows.

These would seem to be so simple and so plain that nothing else would be needed, but man is a resourceful and scheming creature, ever trying to discover ways of technically evading laws without rendering himself liable to the penalties therefor. Courts have been established and men have become skilled in defending violators, to the point where courts that were intended to see that justice is done all men have come to be institutions restricted by precedent, and, in their attempts to treat all alike, a battle field of wits with the constitutional benefit of doubt given the accused forming an effective barrier to bringing many wrong doers to justice. Consequently, it has become necessary from time to time to go farther and farther in defining specific acts of "thou shalt nots," until some find it necessary to obtain legal advice as to whether or not one is trespassing, and frequently the construction of a word or the location of a punctuation mark has been the deciding factor. It might be said in passing that the average, upright, fair-minded individual who respects the rights of his neighbor as his own has no

such difficulty, it being only the one who wishes to evade these laws in spirit but remain within their letter that seeks this advice or finds himself in trouble.

With the rise of civilization, men of like callings organized and laid down rules for the governing of their own members. Physicians, dentists, attorneys, ministers, publishers, skilled artisans and even common laborers have adopted codes, known as codes of ethics. Churches have been founded and have established doctrines for the guidance of its followers. Fraternal bodies have drafted secret tenets and rituals. Almost without exception, they have been founded upon, and are elaborations of, the old basic law. They have been conceived with lofty purposes and are dedicated to improving the morals of the members and, through their influence, the public at large. Membership in these bodies is optional, but, at various times, we find that whole sections which deal with public welfare have been taken from their codes and enacted into law making observance obligatory on all people.

THE DENTAL CODE

Now for our own dental code of ethics: It has been maligned and ridiculed and seldom does one rise to defend it. It is pointed out as a protector of special interests, but seldom do we hear one explaining the protection it gives the public. It is called a means of enabling dentists to charge high fees by keeping the public in ignorance as to the proper cost of dental service, and we allow it to go unanswered when the public could be enlightened as to the impossibility of establishing uniform fees. We are thought of as affluent gentlemen who get our money easily, when the fact is that comparatively few dentists ever become independent through income from their practices, and many die with scarcely enough to pay their funeral expenses. The newspaper advertisements have been full of statements of personal superiority, special methods, low fees, of statements as to what these advertisers are doing for people and their statements as to being persecuted for it, while no word goes out that not one contribution to the upbuilding of dentistry as a health service has ever come from these sources, but that every method which they use has been the result of the laborious and unselfish work of a man, or some men, who have given the results to their profession unselfishly and have never been honored or rewarded.

What dentist advertising his superiority has ever perfected a method of operative procedure that has been adopted? What theory dealing with dentistry and health has been evolved by one of this class? When has one stood before his fellows urging a better service to the public and giving the benefit of his experience? The answer is well known, and if one should either accidentally or by reason of hard work make a beneficial discovery or perfect a technic, this man, because of his natural tendencies, would attempt to keep it to himself, so that if his dear public wished to benefit from it, they would have to contribute to his coffers. We have allowed the situation to come upon us. We have been able to "take it" for years and, as a reward, have seen dentistry as an honorable profession threatened. Surely there comes a time when patience ceases to be a virtue and we owe it to ourselves, our families and our successors to challenge the false statements that are made. No one else is going to do it for us, and, for that matter, it is, I think, a good thing to have to justify our beliefs, for if they will not stand under fire, we might as well discard them.

Our code of ethics consists of two dis-

tinct parts, that dealing with interprofessional relations and that dealing with our relations with the public. The first, the public has no great concern with, but the second, the public, as one of the interested parties, has a right to be informed on, and the information should come from us. Particularly are they interested and entitled to enlightenment when sections of our code are put in the law governing the conduct of dentists, some of whom in turn assert that these same measures are against public interest. Public welfare is the only criterion to be used in measuring the justice of the law. If it be against the public welfare, even though we believe it right, it has no place on the statute books. Let us look these regulations over for a few minutes and see how far they carry out original basic law, how they act on public welfare and how unusual they are.

REGULATION OF PROFESSIONS

In the recent suit testing the constitutionality of the Oregon dental practice act, the defendants (the Oregon State Board of Dental Examiners) made an exhaustive study of the statutes of all states regulating dentists, physicians and attorneys. The statistics given here are taken from the defendants' brief and are considered accurate at this time. Coming legislatures will undoubtedly change the various figures.

A common cause for revocation of licenses is conviction for a felony or misdemeanor involving moral turpitude. This is found on the statutes of thirty-two states as applying to dentistry and in forty-six states concerning, one or more, the learned professions of dentistry, medicine and law.

The renting or loaning of a license or diploma is prohibited by dentists in three states, and, in eleven states, for one or more of the learned professions.

These provisions, of course, are not often called into use and no particular argument is made against them. It is around the various acts defined as unprofessional conduct that the misunderstandings exist. In Oregon, we have fourteen distinct acts constituting unprofessional conduct for which a man may have his license suspended or revoked, most of them also being violations of our code of ethics. These and their inclusion in the statutes of all of the states are as follows:

1. Employing what are known as "cappers" or "steerers" to obtain business; prohibited by dentists in seven states, and by one or more of the learned professions in fifteen states.

2. The obtaining of any fee by fraud or misrepresentation; prohibited by dentists in seven states, with no similar law for other professions.

3. Wilful betrayal of professional secrets; prohibited by dentists in five states, and in thirteen states by one or more of the three learned professions.

4. Employing directly or indirectly any student or any suspended or unlicensed dentist to perform operations of any kind; prohibited by dentists in twenty-eight states, and in twenty-nine by one or more of the three learned professions.

5. Making use of any advertising statements of a character tending to deceive or mislead the public; prohibited by dentists in thirty-six states, and in thirty-nine by one or more of the three learned professions.

6. Advertising professional superiority or the performance of professional services in a superior manner; prohibited by dentists in eight states, and in nine states by one or more of the three learned professions.

7. Advertising prices for professional service; prohibited by dentists in four states. In addition to this, two other states have delegated to their examining

boards the authority to draft rules, and this regulation is embodied in both.

8. Advertising by means of large display, glaring light signs or those containing as a part thereof the representation of a tooth, teeth, bridgework or any portion of the human head; prohibited by dentists in five states.

9. Employing or making use of advertising solicitors or free publicity press agents; prohibited by dentists in four states, and in nine by one or more of the three learned professions.

10. Advertising any free dental work or free examination; prohibited by dentists in two states.

11. Advertising to guarantee any dental service. The Oregon dental practice act is the only instance.

12. Advertising to perform any dental operation painlessly; prohibited by dentists in eleven states.

13. Habitual intemperance; a cause for revocation of licenses of dentists in thirty-three states, and in forty states for one or more of the three learned professions.

14. Gross immorality; a cause for revocation of licenses of dentists in seventeen states, and in twenty-three states for one or more of the three learned professions.

From the foregoing outline, it is seen that laws specifying acts which render a dentist liable to have his license revoked are by no means peculiar to Oregon, and similar laws are in effect regarding physicians and attorneys. These laws have been passed by legislatures when the matter must first be taken before a committee of one or both houses. It has then been passed by both houses of the legislature and signed by the governor of the state. Those opposed to the adoption of any measure have had at least five opportunities to show that the proposed statute is improper. The fact that these regulatory acts have survived the fire in all those branches in such a great number of states is a strong denial of the statement that they have been railroaded through by a clique. The further fact that the same measures have been upheld repeatedly by courts is a final notice that there must be some public concern in them.

The principal controversy, of course, is over the restriction of advertising methods. Why should not a dentist, as well as the purveyor of automobiles, shirts or chewing gum, advertise special bargains, i.e., in the case of the dentist, on dentures, crowns, extractions, etc.? Why should he not tell the world that he is better than any other dentist in the town? Why not guarantee his work and offer free extraction and examination? These are questions that arise in the minds of the public and they are not unnatural ones. The advertisers and the ones selling advertising are active in spreading the impression that there is no logical answer to them, and it becomes our duty to see that they are answered in a sensible manner.

DENTISTRY NOT A COMMODITY

First of all, the difference between a commodity and a health service such as dentistry must be clearly set forth. A person may go to a place of business in answer to an advertisement that an automobile may be purchased for a certain price, that it is guaranteed and that demonstrations are free. He can examine it, ride in it, see what accessories it carries, read the specifications and consult others who drive similar models. He may go to other agencies and make similar investigations and finally make a choice where he believes that he is getting the most for his money. If he finds that he is disappointed or "stung," he probably will shun that place in the future, and even though he were unable to get any use out of the machine and it had no trade-in

value, the very greatest loss would be that of his investment; but the situation in regard to receiving any health service is entirely different. Let a patient enter a dental office to procure dental services. He cannot tell what is being done or what is proper to be done. If the teeth are ruined, the loss is permanent and the financial loss is the least item. If conditions are caused, or those already present are allowed to remain to impair his health, he is blissfully unaware of it until some later time when damage that money cannot repair has been done.

The ancient precept of "the buyer beware" does not obtain in any such service as this. Even so, advertising of professional services might be all right were all of the advertisers honest. But any better business bureau of any examining board has abundance of evidence that advertising of prices, superiority, free work and guarantees are but bait to lure patients to the office where "get the money" is the slogan. The result is that not only has the patient parted with his money, but also, instead of being improved in health, he has frequently been injured and, having parted with his money, he often cannot pay for the additional service. The argument that the advertiser is rendering a service by informing people of moderate means where they may obtain dentistry cheap is a delusion; for this is the very class attracted and who then find themselves in no position to obtain redress.

COURT AUTHORITY

Let these reasons be repeated, only in the language of the Oregon Supreme Court, which cannot be accused of bias or of action for selfish reasons. In its opinion in the case of Semler vs. the Oregon State Board of Dental Examiners, where the constitutionality of the prohibition of this type of advertising was upheld by a unanimous opinion, it says,

The history of legislation in the various states regulating the conduct of practitioners in the learned professions—law, medicine, and dentistry—discloses a marked tendency in recent years to enact more stringent regulations, that the standards of these professions be raised and the ignorant, gullible members of the public be protected from quacks and charlatans who spurn the ethics of their profession and thrive by flamboyant methods of advertising and "high powered salesmanship." . . .

The legislature, in enacting these drastic regulations, was not dealing with a trade or business but with a profession whose members deal with the public under an intimate and confidential relationship. The patient ordinarily has implicit confidence in his dentist. He knows not the intricacies of the treatment nor the reasonable value thereof. He submits to treatment with an abiding faith that his dentist is efficient and will deal honorably with him. Hence, cases involving the regulation of a trade or business—in which every person has a right to engage—have slight analogy to the one under consideration. . . .

We conclude then that, while the right of the plaintiff to practice his profession is a valuable one and is in the nature of a property right of which he cannot be arbitrarily deprived, it is, nevertheless, a privilege subordinate to the duty of the state to enact reasonable laws to protect the public health and safety. . . .

In itself, there is nothing harmful in merely advertising prices for dental work, or in displaying glaring signs illustrating teeth and bridge work, but who will doubt that practitioners not willing to abide by the ethics of their profession often resort to such advertising methods to lure the credulous and ignorant members of the public to their office for the purpose of fleecing them. . . .

There is a species of "bait advertising" which, while not fraudulent *per se*, nevertheless is used by unscrupulous practitioners to lure the unsuspecting public. Such high-pressure advertising generally consists of half-truths. Inducing patronage by representations of "painless dentistry," "professional superiority," "free examina-

tions" and "guaranteed" dental work is, as a general rule, the practice of the charlatan and the quack to entice the public. . . .

The statute has for its purpose the elevation of the standards of the dental profession and the prevention of advertising of a character ordinarily used by unscrupulous practitioners to deceive or mislead the public. . . .

This may all be condensed into one or two sentences. Acts that are not wrong in themselves, which in the hands of the unscrupulous may be used to defraud the public or injure health, are proper subjects for prohibiting to all. Therefore, should all dental advertisers in the state but one be honest and scrupulous, and there remained one who, by his misleading and deceptive statements, was a detriment to public welfare, the state would have the right and the duty to prohibit his acts for the protection of the citizens.

It would be possible to go on and on, with like argument, but that is not my purpose. The object is to emphasize that we must get the message to the public that these regulations are in their interest more than in ours. They must be impressed that these regulations and our code of ethics are right, and that they are founded on the basic law. These are facts, and every one of us should lose no opportunity to spread the word.

DUTY OF THE PRESS

In view of the fact that it is for the public good, it might naturally be expected that the press would use their influence to maintain the ethics of professional life, even at the expense of some sacrifice in revenue from loss in advertising, and while certain of our lay publications may feel that it is asking a great deal to support a movement to curtail professional advertising, it should be said for the honor of the newspaper publishers that quite a number of them have voluntarily decided to refuse advertising of this character in their papers. This has had a most salutary effect on the better element of the profession, and has gone far toward eliciting the cooperation of the press and the professions. But we must add to this every bit of legitimate influence to acquaint our citizens with the essential equity of professional ethics.

We must talk it at the chair, in social groups where opportunity affords and before any organizations such as parent-teacher clubs. And we should prepare ourselves to give convincing arguments. We must have the facts and not make apologies for the law or the code. Thinking people are not hard to convince if proper showings are made and it is our job to do it. An emergency may shortly exist when we will have to fight for these principles. Let no one say that the demand for regulations should come from the public and not from us. Have not insurance laws been enacted at the behest of insurance companies, health regulations at the instance of physicians, blue sky laws on the advice of reputable financiers? Have they not been for the benefit of the public? If not, they have been shortly annulled by the courts, or repealed.

ETHICAL DENTISTS

There is one telling argument used against us—one that we cannot refute by words, only by actions; that is, that the same practices objected to in advertising offices are carried on in the offices of non-advertisers, and it is true. The term non-advertiser instead of ethical dentist is used deliberately. A dentist who defrauds his patients, or withholds the most modern type of dental service when the patient assumes otherwise, is not ethical, even though he may be prominent in his dental society. If he is not honorable, fair and just, and does not treat his patients precisely the way he would wish to be

treated were the positions reversed, he is not ethical. He, in a way, is doing more to degrade his profession and impose on the public than some advertisers. Certain people deliberately select a dentist that they have no other knowledge of than that he does not advertise and so is presumed to be ethical. Then when they have unfortunate experiences, is it any wonder that they condemn the profession who warns them to stay away from the advertiser? The advertiser is marked by his own hands, but the man wearing the cloak of ethics who uses the same high pressure methods and refuses redress is but a wolf in sheep's clothing. The practice of requiring patients to pay in advance and then losing interest if they have trouble is not in accord with ethics or professional ideals. The use of high pressure salesmanship methods is equally nonprofessional and, in my opinion, unethical. Anything but exhaustive examinations when a patient is in search of the cause of systemic disease is, unless the patient definitely understands the situation, unfair and unethical. When we desire incorporation of our code of ethics in legislation and its approval by courts, we adopt the premise that dentistry is a profession and not a business. How can we abandon it when considering ourselves and our patients?

Whose fault is it that such conditions as this exist? Primarily, our dental organizations, who have accepted the responsibility for dental standards, and yours and mine as members of the organizations. Ethics is not stressed enough in our meetings except as it is considered synonymous with not advertising. The lay economist has taught us tricks which may be sound economically if ours is a predatory business, but are destructive if it is an honorable profession. Our teaching institutions cannot say that they have been so zealous as they could have been in inculcating ethics as handed down by true professional traditions. Otherwise, recent graduates would not so easily fall into the ways that we disapprove. True ethics cannot be taught in an hour a week, for a time during the final year, but must be drilled into students in every class in every year. It must be preached to them with something like a religious fervor. This can only be done by men who have the uncompromising conviction that ethics is the foundation of dentistry as an honorable profession. Men not of this conviction or even those who are passive in the matter should, regardless of their other qualifications, be removed from our faculties, that they may not contaminate our students during this impressionable time.

If we are to remain an honored profession, commanding respect as has the old time family physician, we must first put our house in order. We must teach our young men the true philosophy of ethics. We must keep the ideals constantly before our societies, and purge them of violators so that our members will be looked on as men in whom all may repose confidence. If we do this, little will be necessary in the way of resisting outside influence, but we can go to the public and proudly justify the incorporation of sections of our code of ethics in the laws regulating dentists. "Ethics" means right, and our code of ethics is right. Let us not be afraid to fight, if necessary, to clean our ranks of the unethical, whether they be advertisers or nonadvertisers, and let us show the people that our profession is still dedicated to serving as practitioners of the healing arts have always been, to the point of sacrifice if necessary. If this is done in sincerity, little will be necessary in the way of legislation, and when it is necessary, there will not be much trouble in procuring or upholding it.

1015 Selling Building.

ARE ANATOMIC TEETH SUITED FOR FULL DENTURES?*

By GEORGE P. PHILLIPS, A.B., D.M.D., Boston, Mass.

THE question of tooth forms for full dentures has held the attention of the dental profession since the early recognition of the importance of mandibular movements, and the design of articulators for their production.

Dental literature is replete with full and detailed accounts of the work done in this field from Bonwill to Gysi, Hanau, House, Needles, Wadsworth, Hall, Monson, Stansbery and others.

For years, tooth forms for dentures clung more or less to forms resembling natural teeth of varying cusp inclinations. Not until Gysi designed the "trubyte" posterior teeth was there established a clear understanding and recognition of the relationship which exists between mandibular movements and the cusps of the teeth. These were based on a correct mechanical conception of the function of the temporomandibular articulation as far as it could be applied to standardized posterior teeth with an approximate cusp inclination of 33 degrees.

Later, tooth design went farther. Teeth were designed with a 45 degree inclination. Artistically and mechanically, these teeth seemed to be the embodiment of perfection. They functioned perfectly. Patients were delighted with them. Then came the day of reckoning. Something began to happen to the tissues. They began to melt away, the dentures had to be relined often, until the once well-formed ridges of the maxilla and mandible were reduced to a mere shadow of their original form.

Until the advent of the very steep cusped teeth, tissue resorption with occational relining was accepted as a matter of course. It was the speed with which the tissues were destroyed under these teeth that directed attention to the possible danger from increase of the cusp height. Then the tide turned, and the cusps were blamed for all resorption.

Sears teeth were a relatively conservative departure from the original anatomic teeth as compared to the forms that followed later. Sears himself repeatedly stated that the present channel teeth were not the last word in the nonanatomic teeth, but simply the first departure from the old forms.

Then along came the inverted cusp teeth designed by Hall. These, owing to some merit and to Dr. Hall's own endless energy and sincere conviction that they were the last word in tooth design, as he preached his gospel throughout the country, gained considerable ground. Now the tide is turning again, and we find ourselves in the predicament of trying to decide which of the two extremes is the least evil.

In view of these introductory remarks the question raised by the title of this presentation "Are Anatomic Teeth suited for Full Dentures?" seems pertinent.

*Read before the Section on Full Denture Prosthesis at the Seventy-Sixth Annual Session of the American Dental Association, St. Paul, Minn., Aug. 8, 1934.

Hall's strongest argument in favor of the cuspless tooth has been, and it still persists and perplexes the minds of many, the fact that we find many patients wearing artificial teeth made forty or fifty years ago with flat cusps or cusps ground to flat surfaces, and that these dentures are still useful and comfortable, and the ridges under them are still in good form.

A person who is alive and well, forty or fifty years after losing his teeth, and still can wear his original dentures, must have been a pretty tough and healthy specimen in his day. He must have lost his teeth in his early thirties or twenties. He may have had pyorrhea, which I doubt very much, but at any rate he must have escaped the periodontist. He could not have had treated or devitalized teeth of long standing. Consequently, when his teeth were extracted, they must have come out clean without much mutilation of the ridges, which usually accompanies extraction of teeth long pulpless.

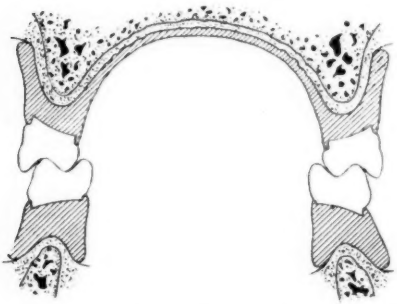

Fig. 1.—Centric occlusion in so-called anatomic teeth.

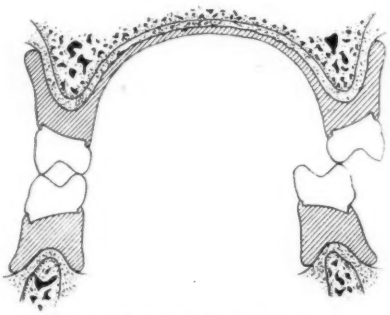

Fig. 2.—Position of lateral balance.

Thirty or forty years ago, immediate dentures or dentures inserted within a short time after extraction of the teeth were quite uncommon. Patients had to go without teeth for from three months to a year or more.

It is a well-recognized fact that, during the period that elapses between extraction and the insertion of dentures, considerable tissue change in both the mouth and the temporomandibular articulation takes place, owing to lack of function, or to the abnormal use to which the ridges and the mandible would be subjected while the patients are "gumming it." During such a period of waiting, the temporomandibular articulation of a person with a steep condylar index at the time of extraction may develop a low or flat index, so that, when the dentures are inserted months later, the mandible may be functioning on a practically horizontal plane, requiring little or no balancing.

I recall one case in particular a few years ago that may serve as an example. A woman in her early forties had all her teeth out. She intended to wait six months before she had her dentures made, but after her teeth were extracted, she found that she could not bring her jaws together within 4 or 5 mm., and she was quite uncomfortable; so she decided to have a temporary set made until she returned from the country.

When she returned six months later for another set, I found that she had worn the first set of teeth that I made for her for but a short time. On examination, I found that the jaws met com-

fortably, and she could eat most everything that she wished to eat without her dentures. The mandible had migrated forward considerably, so that the second set of dentures that I constructed for her had to have no perceptible overbite and be made on an almost horizontal plane.

I am referring to this case simply to call attention to the changes that may take place in edentulous mouths if left without dentures for any great length of time, and to point out the erroneous conclusions at which one may arrive when referring to dentures made many years ago, without a complete history and records of the cases, from the extraction of the teeth to the construction of the dentures, and all subsequent work.

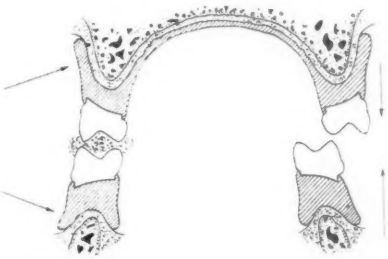

Fig. 3.—Relation of teeth on balancing side on insertion of bolus on working side.

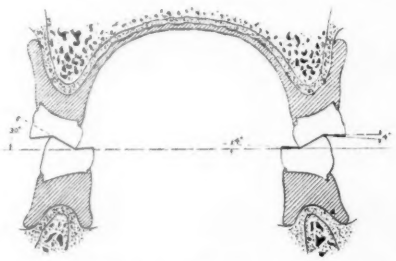

Fig. 4.—Centric relation; upper buccal and lower lingual cusps reduced.

This is exactly what has been taking place in the past, when patients were in the habit of waiting a long time for their dentures after extractions. Is it any wonder, then, that flat cusped teeth served well? And not from choice or owing to a proper diagnosis on the part of the dentist, but because flat cusped teeth were the only available ones at that time. In the sections of the country where the same conditions prevail today as in the past, we find the old types of teeth still tolerated for function, but hardly for esthetics.

There is also another explanation for the results which the advocates of cuspless teeth associate with the dentures of thirty or forty years ago. The adaptability of the tissues of the mouth, the mucosa, the underlying bone and the temporomandibular joint in the younger and healthier denture patients is greater and more persistent than in older and less vigorous patients.

To illustrate: Let us take two edentulous patients, one young and vigorous in the twenties, and another one in the fifties, also healthy. I employ the word healthy advisedly. Every sick or unhealthy denture patient does not of necessity suffer from rapid resorption. There are illnesses which have no apparent effect on the recuperative power of the bone and tissues of the mouth or its resistance to trauma; while others, such as those suffering from chronic circulatory, digestive and allied ailments, seem to be more or less susceptible to trauma. To return to the illustration: If dentures of the simple plain line type were constructed for these two patients with no attempt at balancing, but in good centric occlusion with a small overbite, at first both sets would be out of incisal balance. A year or so later, it would be found that the separation at the posterior region in the incisal position in both patients had disappeared either partly or entirely and

the dentures would be in apparent balance.

Now, although the apparent results after a year will appear to be identical in the two patients, on examination we will find that this balance in the incisal position is due to tissue changes of two diametrically opposed types.

In the younger patient, there will be a true balance and a more nearly permanent one than that found in the older one, because it will represent a functional and physiologic adaptation of the tissues, whereas the balance in the older patient will be due to the irreparable tissue destruction due to the resorption of the anterior portion of the ridges to the level of the posterior one.

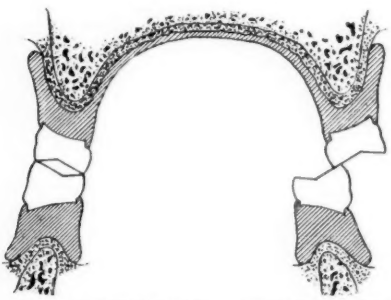

Fig. 5.—Teeth in balance. The buccolingual width of the reduced cusps is two thirds of the inclined planes of the retained cusps.

In other words, the balance between wear and upkeep in the younger patient being more constant and of a longer duration, the automatic balance in the incisal position, which has developed in this case in the course of a year or so, is due to adaptive, functional and physiologic changes, and not to mechanical, frictional and destructive leveling of the ridges to a temporary state of equilibrium, as in the case of the older patient.

In this example, I have taken two vigorous patients with a discrepancy in age only. One does not have to stretch his imagination to guess what will happen to the mouths of patients suffering from the many ailments and diseases which make them susceptible to trauma and bone resorption.

How are we, then, to maintain tissue health and relative tissue permanence in denture patients? Are we going to ignore and cast aside all the information that research has supplied us as to tissue changes, masticatory habits, masticatory function and other biomechanical aspects of denture construction?

Whether general dentistry as practiced today by devitalization of teeth, periodontal treatments and injudicious construction of partial dentures is conducive

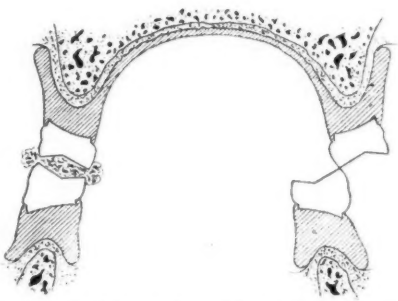

Fig. 6.—Bolus and tooth balance when last third of inclined plane is traveled.

to the future dental health and happiness of the older patients, is a matter beyond the scope of this paper, but the fact remains that, day after day, we are called on to supply dentures to an increasing number of patients with mouths badly mutilated, for many reasons, some of the conditions being preventable and others little known.

It is our duty as dentists to restore such mouths to a semblance of their original efficiency, with comfort and a reasonable degree of permanence, and to this end I shall attempt to present what

I consider a way out, as far as tooth forms may contribute to the success of such dentures.

Cuspless teeth have been given a fair trial at the expense of esthetics, phonetics and even comfort, with no apparent lessening of tissue resorption. As in most human endeavors, we have gone from the one extreme of hair splitting over the various relationships of the occlusal planes of the upper teeth to the lower in all mandibular relations, to the other extreme of throwing to the wind everything that we could have gained and learned from our successes and failures, and we are now forced through circumstance to accept tooth forms which do not meet even the most rudimentary requirements of denture construction.

I have referred to the cuspless teeth as not having contributed to the lessening of tissue resorption. One of the safeguards with which Nature has provided us against injurious stimuli is pain or discomfort. It is this safeguard that makes it possible for denture patients to become adapted to almost any sort of dentures, whether balanced or not. Not that the tissues of the mouth adapt themselves to the dentures, but that the patients, in order to avoid pain or discomfort, become resigned to their fate and tolerate dentures of much reduced efficiency and, in some cases, of no efficiency at all. The wearing of unbalanced dentures with cusped teeth is quite likely to produce considerable pain, especially in older patients, owing to cusp interference, which forces them to exert less pressure in mastication. In this way, they are safeguarding themselves against trauma.

In the case of the cuspless teeth, quite the opposite thing happens. As they experience no great amount of discomfort from the start on account of the lack of cusp intereference, they begin to use their dentures quite vigorously. But the constant rocking motion of their dentures, due to lack of tooth contact on the balancing side, which is needed to accommodate the descending condyle path, subjects the tissues to a painless but continuous trauma.

I do not wish to imply that I would prefer a painful, unbalanced denture built with cusped teeth to one built with cuspless teeth. My concern in the matter lies in the fact that we have only one pair of jaws to last us a lifetime and as yet no means have been found to grow new ridges. Hence, the logic of trying to conserve the tissues from preventable trauma, whether painful or not.

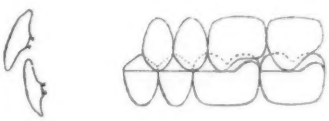

Fig. 7.—Lateral view of teeth in centric relation. The clearance between the inclined planes of the mesiolingual cusps of the upper and distolingual cusps of the lower molars is equal to the overjet of the anterior teeth.

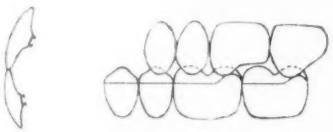

Fig. 8.—Incisal balance.

This condition of painless trauma in dentures with cuspless teeth is analogous to traumatic occlusion in periodontia, when traumatic resorption may continue for years without any sign of painful irritation.

Truly anatomic teeth offer the only solution to the tooth problem of denture construction. Truly anatomic posterior teeth for dentures should be designed in such a way as to meet all the anatomic

and physiologic requirements of mastication as related to the bicuspids and molars, without depriving the anterior teeth of either their masticatory or nonmasticatory functions. As the function of the teeth is not limited to mastication alone, but concerns esthetics and phonetics also, the true anatomic tooth must meet all these requirements to a greater degree than any of the present forms.

With the possible exception of the cuspids in some instances, the masticatory function of the anterior teeth is limited to incising only, while their nonmasticatory function is esthetics and phonation.

It is very difficult to draw the line between anatomic and physiologic requirements, as they are closely related and are quite interdependent. If we bear in mind the fact that form and function are inseparable, we can understand why we have so many variations from the normal and why every denture case has to be treated as an individual case and also why all attempts at standardization have failed. Roughly speaking, the appearance and form of the teeth and the structure of the temporomandibular articulation may be the anatomic requirements, while tissue reaction concerns stresses; and muscle function, the physiologic requirements.

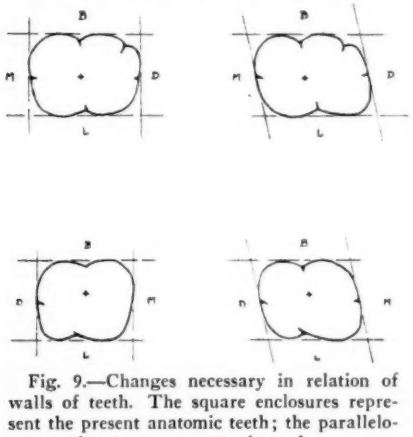

Fig. 9.—Changes necessary in relation of walls of teeth. The square enclosures represent the present anatomic teeth; the parallelograms, the new true anatomic teeth.

From the foregoing attempt at a definition of the true anatomic teeth, it follows that such teeth may possess all these requirements and still lack the form symmetry of the natural teeth. The present so-called anatomic teeth do not even deserve the name either for form or function if we are to judge them by what they can do.

Of the present teeth available, the cusped or so-called anatomic teeth occupy one end of the scale and the cuspless teeth the other end, the Sears and French teeth occupying a position somewhere between these two extremes. It is between these two extremes that the solution of the problem lies.

I attribute the failure of the cusped teeth to the introduction of the opening component on the working side, and that of the cuspless teeth to the elimination of the balancing component. In the true anatomic teeth, the opening component of the working side should be eliminated because it causes undue stress on the working side, but the balancing component must be maintained in order to provide balance and harmony between the dentures and the descending path of the condyle.

There are two other features that the true anatomic teeth should possess:

1. A provision for the shifting of the bite. The inevitable initial condensation of the tissues when dentures are newly inserted and the consequent forward migration of the mandible are two very disturbing features in full denture construction. The cuspless teeth, owing to the total elimination of the cusps, do not present this problem, but the present anatomic teeth present almost endless difficulties, which, in most cases, culmi-

nate with the eventual grinding off of all the cusps and the loss of esthetic values and efficiency. To keep up with this aggravating feature of the present anatomic teeth in a closely articulated set of dentures, forty-eight inclined planes will have to be freed from time to time, and this procedure, at best, offers only temporary relief.

2. Provision for bolus and tooth balance. The question "What will happen to the balancing side of a well articulated, balanced and milled set of dentures, when a bolus of food is inserted on the working side?" is asked from time to time, and is used by some as the most formidable argument against balanced occlusion. If one would take the time to analyze the process of food reduction from the insertion of the bolus of food into the mouth to the state just before deglutition in denture patients, the argument will lose most of its weight. Considerable help can be provided in that direction for most patients by the establishment of a bolus and tooth balance.

Up to this point, I have tried to give my reasons for advocating true anatomic forms for posterior teeth, and I shall try to give the reasons that I call teeth that are not true to tooth symmetry of the natural teeth truly anatomic.

In the process of evolution from the lower animals to the present human form, Nature has continually taken away or has reduced to a rudimentary form such anatomic structures as have outlived their usefulness and are no more needed. But whatever anatomic structures she preserves are no less anatomic because they do not conform strictly in form to their predecessors.

In the case of edentulous patients, necessity calls for the replacement of lost organs, because they have outlived their usefulness as far as their retention has become detrimental to the organism as a whole. But their replacement calls for the solution of mechanical problems foreign to the natural dentition. Now if the tooth phase of the problems in dentures calls for elimination of certain cusps or their reduction to a rudimentary form and the retention of others, does that make them mechanical or nonanatomic, because they do not measure up to the tooth symmetry of the natural teeth? If it does, none of the present anatomic teeth should be called anatomic, because they all have to be altered considerably during their setting-up.

The basic principles of the teeth which I am offering as a solution to the problem are these:

1. Reduction of the buccal cusps of the upper teeth to a horizontal or nearly horizontal plane.

2. Reduction of the distolingual cusps of the upper molars to a rudimentary cusp form.

3. Reduction of the mesiolingual cusps of the lower molars and bicuspids to a horizontal plane, parallel to the buccal cusps of the upper molars.

4. Changing the occlusal aspect of the teeth from a form conforming to a square to that of a parallelogram, pointing mesiolingually for the upper and distolingually for the lower teeth.

5. Maintaining the buccolingual width of the reduced cusps of the upper and lower teeth in a ratio 2:3 to the inclined planes of the lingual cusps of the upper and buccal cusps of the lower teeth.

Teeth designed according to these principles should meet all the tooth requirements for full dentures.

29 Commonwealth Avenue.

SURGERY AS AN AID TO MORE EFFICIENT SERVICE WITH PROSTHETIC DENTURES*

By V. H. KAZANJIAN, D.M.D., M.D., F.A.C.S., Boston, Mass.

THE efficient construction of a denture involves many technical problems requiring a high degree of skill.

The work of the prosthetic dentist is often made difficult because, in addition to the complexities of technic, he has to deal with tissues offering many variations in shape and contour—the palate, alveolar edges and soft tissues of the mouth. Mouth conditions, furthermore, are not static, but are changing constantly.

Fortunately, most mouths, even if they vary considerably, are within the range of normality, and their variations in no way prevent the construction of an efficient denture. There are many abnormal mouth conditions which are beyond the mechanical skill of the dentist, and even if the construction of a denture is possible, the patient is obliged to be satisfied with a much less efficient appliance.

Until recent years, little attempt was made to correct these defects surgically. The dentist depended largely on mechanical means to overcome his difficulties. Judicious surgical interference in selected cases is a distinct advantage. Surgery's aim, in these circumstances, is to aid or assist the prosthodontist, because generally we are dealing with unfavorable environment rather than a pathologic condition. With the prosthetic dentist rests the responsibility for electing surgical interference; but upon the surgeon falls the task of determining the type of operation. For this reason, it is important for him to make a careful study of the abnormal condition and plan the operation accordingly. Hastily conceived and poorly planned operations may do more harm than good. Having this in mind, I should like to outline a plan of operative technic.

Mouth abnormalities unfavorable for the construction of an esthetic and serviceable denture may be classified under (1) developmental abnormalities and (2) traumatic abnormalities. Under the former, we can list overprominent alveolar ridges, exostoses and hypertrophy or atrophy of certain tissues.

The presence of prominent alveolar ridges may not handicap efforts to secure retention of a denture, yet it often reduces the intermaxillary space and causes abnormal bulging, thus creating difficulties in setting the teeth, with a corresponding sacrifice of esthetics.

Among the many bony prominences, called exostoses, torus palatinus in the median raphe of the palate is most common. Bony projections at the lingual aspect of the lower jaw and abnormal prominence of the tuberosity of the hard palate are not infrequent. None of these conditions is pathologic. The patient is rarely conscious of them, and even a large torus palatinus overhanging the center of the palate seldom causes the patient to

*Read before the Section on Full Denture Prosthesis at the Seventy-Sixth Annual Session of the American Dental Association, St. Paul, Minn., Aug. 7, 1934.

complain; but when circumstances oblige a patient to use artificial dentures, the presence of such conditions will occasion distinct mechanical difficulties.

Excessive hypertrophy or atrophy of the palatal mucous membrane is likewise a serious mechanical handicap. Normally, the soft tissues on either side of the hard palate are firm, but with a certain amount of resiliency because of the connective tissue beneath the mucous membrane. Excessive hypertrophy of the submucous tissue produces a flabbiness which interferes with retention of a full denture. Marked atrophy, where resiliency is lacking, may be equally disadvantageous.

The traumatic abnormalities present far greater difficulties from the standpoint of treatment.

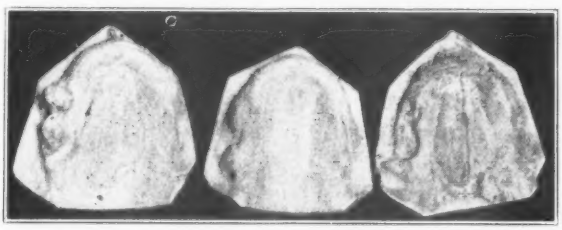

Fig. 1 (Case 1).—Models of patient with torus palatinus of median raphe of palate, before and after operation.

Minor defects of the contour of the alveolar ridges are often caused by injury inflicted on the alveolar bone and soft tissues during extraction of the teeth. The fracture or intentional removal of alveolar bone will generally reduce the height of the buccal sulcus, and when, in addition, soft tissue has been destroyed, scars and adhesion bands extending to the alveolar crest are likely to follow. Sharp bony spines and deep undercuts, especially in the upper molar region, will result from failure to trim these projections at the time of extracting the teeth.

The wearing of ill-fitting dentures over a long period of time may cause many abnormalities of a truly traumatic type. No reflection on the accuracy of dentures when first constructed is herein implied. But how often we find patients who fail to appreciate that mouth conditions change from year to year and that dentures should be frequently inspected and perhaps adjusted. As a result, many patients wear for years dentures constructed as only a temporary appliance.

Under such circumstances, normal absorption of the alveolar bone occurs and the resulting space is filled with hypertrophied mucous membrane. At other times, the constant irritation of the borders of the dentures appears to stimulate, along the periphery, the formation of tissue resembling small fibrous tumors. Generally, when the cause of the irritation is removed, the tissues are likely to resume their normal state; yet occasionally we find extensive growths of fibrous tissue which can only be treated surgically.

Absorption of the bone may likewise ensue when the teeth of the denture have not been set according to anatomic measurements, as, for instance, when plain line articulation is used. Masticatory power is reduced, and the force of mastication causes uneven pressure over the alveolar ridges, producing absorp-

tion. The patient is obliged to perform with the anterior teeth the grinding normally carried by the molars, and, from these conditions, we find excessive bony absorption resulting in flat ridges, improper buccal grooves and flabby soft tissues over the ridges.

Of course, not all flat ridges are attributable to faulty occlusion in artificial dentures. Pyorrhea may cause the damage, and often even the normal wear

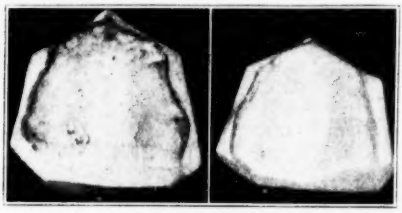

Fig. 2 (Case 2).—Prominent alveolar ridges of upper jaw. Left, before operation; right, after operation.

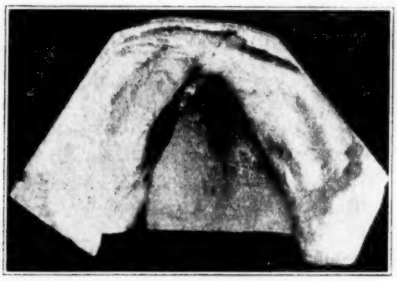

Fig. 3 (Case 3).—Sharp edges over top of lower alveolar ridge combined with deep undercut on each side of the lingual surface, making it difficult for patient to use lower denture.

and tear of the tissues is rapid enough to produce marked changes.

I have purposely omitted mention of gross defects of the face and jaws such as are caused by fractures, gunshot wounds, automobile accidents, malignancies or deformities resulting from major operations of the mouth, as that is another story.

Before proceeding to a detailed description of various operations for correction of the above-mentioned defects, it might not be out of place to emphasize that greater care in handling mouth tissues during extraction of teeth will undoubtedly prevent many minor defects. I realize that it is not always possible in difficult operations to remove the roots of the teeth without sacrificing the buccal plate of the alveolar ridge; in which case, one must take care to smooth out the sharp bony spines and not to traumatize or excise the alveolar mucous membrane unnecessarily. Excessive ex-

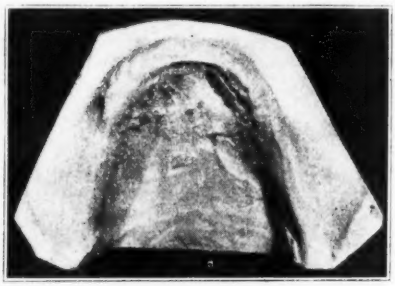

Fig. 4 (Case 3).—Model showing appearance of lower alveolar ridge after operation.

cision will invariably lessen the depth of the buccal grooves and create fibrous bands extending over the center of the ridge.

A great deal has been written recently regarding alveolectomy immediately following the extraction of teeth. Normal, well-proportioned jaws do not require any more manipulation of the bony and soft tissues than the slight trimming of the sharp bony edges and the suturing of the lacerated tissues. It sometimes becomes necessary to trim the alveolar ridges in order to establish normal proportions for esthetic as well as mechan-

ical reasons. In such cases, the mouth should be studied carefully on articulated models to determine just how much tissue must be removed. Thus, alveolectomy becomes a desirable procedure for the care of abnormally prominent alveolar ridges.

TREATMENT OF ABNORMALITIES

Many minor defects characterized by bony projections, such as exostoses and torus palatinus, are easily repaired by an incision over the area and retraction of the soft tissues until the prominence is well exposed. Its removal may be accomplished with rongeurs or chisels. The surface is then smoothed, and the wound closed with silk or any similar sutures. Occasionally, it may be necessary to remove a part of the soft tissues where there is an overabundance.

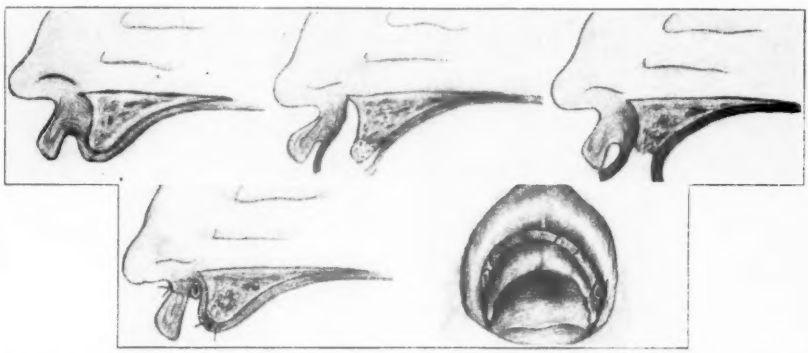

Fig. 5.—Various steps of operation for removal of prominent alveolar ridges without sacrificing height of gingivobuccal fold.

REPORT OF CASES

CASE 1.—N. T., an elderly woman, had been using an upper horseshoe-shaped vulcanite denture for many years. The denture was supported by two molar teeth on the left side. These teeth gradually became loose, but the patient was advised by her dentist that if she lost these two teeth, it would be impossible to make a full denture for her because of the presence of a torus palatinus (prominent exostosis) at the median raphe of the palate. As a result, she allowed the teeth to become very loose and lived on soft foods in order to save the teeth. When the patient was first seen by me, the teeth were very loose and there was a good sized torus palatinus at the median raphe of the palate. (Fig. 1*a*.) She was advised to have the molars extracted and the exostosis removed. This was done under local anesthesia with very satisfactory results. She has been able to wear a full denture comfortably. (Fig. 1*b-c*.)

CASE 2.—This patient had pronounced alveolar ridges of the upper jaw with overhanging edges at the cuspid areas as well as the tuberosities, and one side of the posterior edge. (Fig. 2*a*.) The operation, which was performed under local anesthesia, consisted of exposing the bony prominences and trimming a sufficient amount to reduce the size of the upper jaw. (Fig. 2*b*.)

CASE 3.—This patient was unable to use a lower denture because the sharp edges over the top of the ridge combined with a deep undercut on each side of the lingual surface caused a great deal of irritation. (Fig. 3.) In this operation, an incision was made along the entire edge of the ridge, and the bone exposed and a certain amount

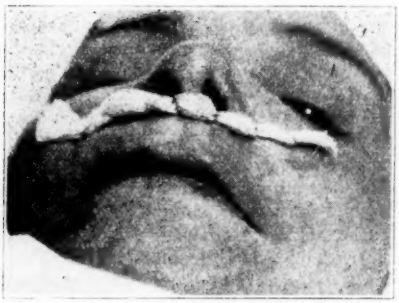

Fig. 6.—Interrupted mattress sutures tied over gauze to prevent the cutting of skin.

Fig. 7.—Elastic band fastened under tension with adhesive over lip dressing to maintain pressure from without and to control edema.

Fig. 8 (Case 4).—Upper jaw with prominent alveolar ridges.

Fig. 9 (Case 4).—After operation.

Fig. 10 (Case 4).—Position of rubber tube high up along gingivobuccal fold.

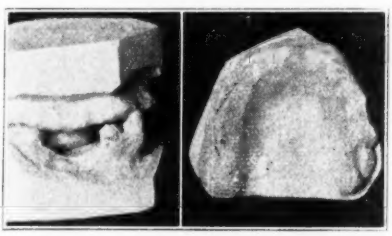

Fig. 11 (Case 5).—Appearance of jaws before operation.

of it trimmed. The mucous membrane edges were sutured together, the sharp ridges as well as the undercut thus being obliterated. (Fig. 4.)

Abnormally prominent alveolar ridges of the upper jaw require more detailed discussion owing to the importance of

preserving an adequate gingivolabial fold and proper height of the residual ridges. Removal of the protrusion may often reduce the height of the ridge and make the wearing of a denture difficult. The

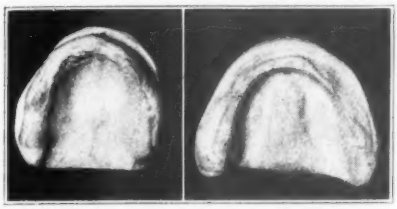

Fig. 12 (Case 5).—Jaw after operation.

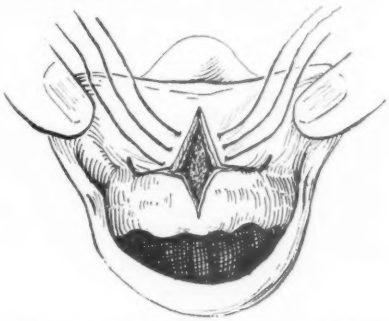

Fig. 13.—One method of repairing fibrous bands after horizontal incision extending from base of band toward buccal fold. The lower borders of the wound are sutured in a vertical line.

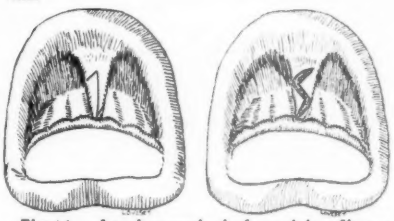

Fig. 14.—Another method of repairing fibrous bands by using the z incision.

following procedure obviates this complication:

An incision is made along the prominent margin down to the bone. (Fig. 5*a*.) All tissues are carefully elevated, not only to the palatal surface but also anteriorly, well up to the anterior nasal spine and canine fossa. Extensive undermining of the tissues is important. (Fig. 5*b*.) Excessive bone is removed by a rongeur (Fig. 5*c*), the labial flap is carried high up and the margins of the incision are approximated by interrupted sutures. The removal of bone allows the labial flap to slide to a higher position.

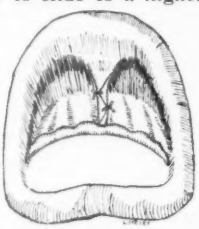

Fig. 15.—Sutures after transposing flaps made by z incision.

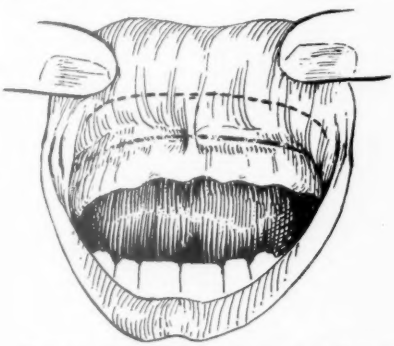

Fig. 16.—Various steps for repair of fibrous adhesions covering extensive area over alveolar ridge.

which is maintained by placing a small flexible rubber tube well up under the lip and passing interrupted mattress sutures around it and through the lip on to the face as shown in Figure 5*d-e*. These are so placed as to create an upward tension on the mucous membrane surface. They are tied over gauze to pre-

vent the cutting of the skin. (Fig. 6.) A dressing is then placed over the lip and strapped in place with adhesive. This adhesive strap is split and one-half placed over the nose for support. (Fig. 7.) To help control edema and to maintain pressure without, a double elastic band may be fastened under tension with adhesive over the lip dressing. The band can be removed the next morning, but the sutures and the rubber tube should not be removed for four or five days.

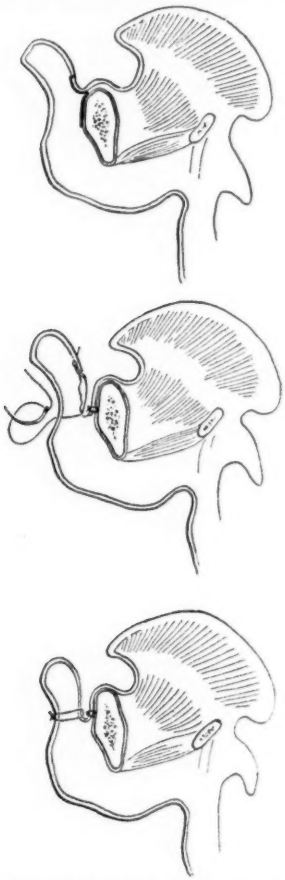

Fig. 17.—Various steps for repair of fibrous adhesions covering extensive area over alveolar ridge.

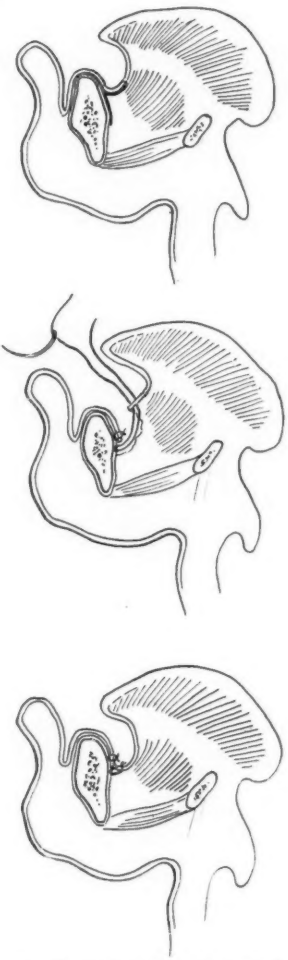

Fig. 18.—Operative steps to extend ridge along lingual side of mandible.

The tension of the rubber tubing maintains adequate and equalized pressure on all the tissues and ensures a good gin-

givolabial fold, which will not close when the sutures and the tubing are removed.

In operations on the anterior part of the upper jaw, it is often necessary to remove a section of the anterior nasal spine in order to allow a higher buccal sulcus.

CASE 4.—D. S., aged 44, had an edentulous upper jaw with prominent bony ridges. (Fig. 8.) She was advised by her local dentist to have these ridges removed. My examination confirmed the earlier findings, especially in the anterior region where the lower teeth were biting against the palatal side. The problem in this case was to remove enough of the prominence without destroying the height of the buccal sulcus. The operation was performed at the Massachusetts Eye and Ear Infirmary under local anesthesia, June 15, 1934, along

Fig. 19 (Case 6).—Models of case before and after operation. The muscle attachments came very near the crest of the ridge. Operation for the extension of the ridge was as shown in Figures 16 and 17.

the same lines as described above, with very satisfactory results. (Figs. 9-10.)

CASE 5.—This patient was referred to the surgical clinic of the Harvard University Dental School by her local dentist, because she presented an unusual condition of the upper jaw requiring surgical interference. Examination showed the buccal plate of the upper alveolar ridge markedly prominent with sharp edges. It was evident that the patient had been using the gums for chewing as the crest of the alveolar ridge was more or less flattened. There were only a few teeth on the lower jaw, as shown in Figure 11. Operation was performed under local anesthesia. The remaining teeth were removed and the sharp bony spines about the sockets were trimmed. The bony ridges of the upper jaw were exposed and trimmed with a rongeur. It was necessary to excise enough mucous membrane from the labial border to allow approximation for suturing. In this instance, no attempt was made to raise the height of the residual ridge as there was sufficient buccal fold after the abnormally prominent ridges were removed. (Fig. 12.)

TREATMENT OF ABNORMALITIES OF SOFT TISSUES COVERING ALVEOLAR RIDGES AND PALATE

Repair of Fibrous Bands.—If the deformity consists of nothing more than the extension of a fibrous band over the center of the ridge, such as we occasionally see at the frenum or at the lateral aspect of the jaws, it is easily repaired by a horizontal incision extending from the base of the adhesion toward the buccal fold. (Fig. 13.) A raw surface will be left when the loose end is pulled out of position, and this is repaired by suturing the mucous membrane borders together. When there are indications that the last suture will be too tense, it may be necessary to make a horizontal incision along the buccal groove in order to approximate the borders. This leaves a raw surface over the alveolar ridge, but since one side is covered with normal mucous membrane, the raw surface will heal without distortion of the loose buccal tissues.

Another method for the obliteration of fibrous bands is a modification of the z incision which is used extensively for the repair of weblike adhesions resulting from scar tissue in various parts of the body.

A vertical incision is made along the entire length of the defect, beginning at the margin of the ridge and extending toward the distal end over the cheek or lip. (Fig. 14.) The two sides are undermined freely. Two lateral incisions are

then made to form the flaps, one incision extending close to the alveolar ridge, while the other extends to the mucous membrane of the cheek. These three incisions look like a letter z. Each flap is then drawn over in place of the other and sutured, with the result that the fibrous band is obliterated without leaving any raw areas. (Fig. 15.)

various degrees of hypertrophy of the alveolar mucous membrane.

The essential point in operative treatment is to extend the buccal and labial grooves so that the lower dentures will have a larger resting area, while the upper dentures will have deeper residual ridges. With hypertrophy, in addition to the extension of the ridges, the flabby

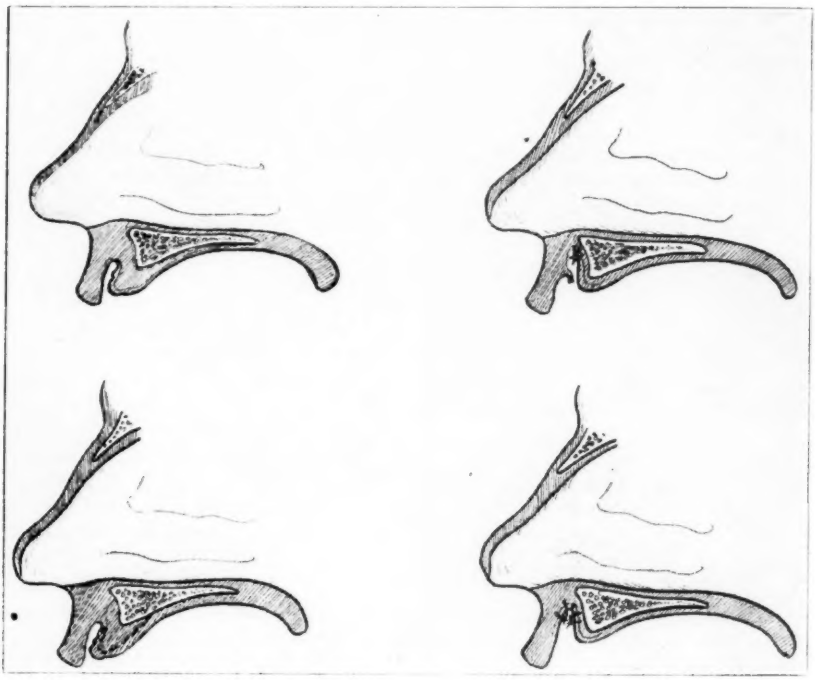

Fig. 20.—Diagrams showing various steps in operation for removal of flabby tissue from anterior part of upper jaw and also for reestablishment of height of buccal fold.

Operation for Ridge Extension of Upper or Lower Jaw.—I have already outlined various causes for the diminution or loss of the gingivolabial fold. These do not always present a uniform picture. Absorption of the alveolar bone sometimes simply reduces the size of the buccal or labial area, but there may be tissues over the ridge must be eliminated. This condition is more frequently seen in the anterior region of the upper jaw rather than in the lower jaw. The fundamental principle of the operation that I shall describe is the same in each case, with, of course, minor modifications to meet the variations of the individual case.

If the fibrous adhesions cover an extended area over the alveolar ridge, the following operation, which I have used for many years for ridge extension whether of traumatic origin or otherwise, is well adapted. A horizontal incision is made on the surface of the lip or cheek on a line parallel to the alveolar ridge and about 1.5 cm. externally from it. (Fig. 16.) With a sharp instrument, the loose tissues under the mucous membrane are undermined and freed from the membrane as far down the external side of the periosteum as is necessary. This loose flap of tissue attached to the alveolar ridge is then pushed or folded down against the periosteum and sutured in place. The raw surface on the lip or cheek is then closed by suturing together the top and bottom margins of the raw area. Sutures may be passed through the skin, if necessary, since these do not leave any permanent scars. (Figs. 17-18.) There are one or two points of technic that must be followed for successful results. First, the incision line should be far enough from the ridge to allow enough mucous membrane to cover the newly formed ridges; secondly, the periosteum must not be disturbed, but all the submucous tissues, including the attachments of the muscles of expression, should be pushed apart from it; and care must also be taken in suturing not to tear the periosteum. This operation is equally adaptable for reformation of the buccal groove for either the upper or the lower jaw.

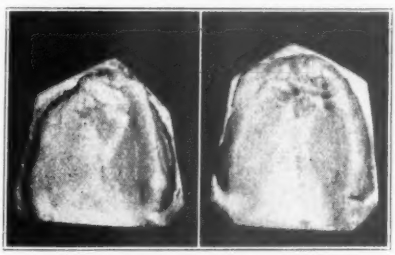

Fig. 21 (Case 7).—Models (right) showing absorption of bony ridge at anterior aspect of upper jaw; (left) extension of ridge higher up into buccal fold. (Compare Figure 20.)

Case 6.—Mrs. R., aged 34, was injured in an automobile accident, Feb. 21, 1934, the lower jaw being fractured and the tissues badly lacerated. My examination, June 11, showed a well-defined lower ridge, but the muscle attachments came very near the crest of the ridge, especially in the anterior region. (Fig. 19*a*.) Operation was performed under local anesthesia, following the same technic as outlined above. (Fig. 19*b*.)

In some cases, in which there are indurated scars and deep adhesions, a sufficient amount of mucous membrane is not available for the above described operation, and we are obliged to resort to skin grafting.

The removal of flabby tissue from the anterior part of the upper jaw should not be confined to mere excision of the tissue since that would result in a flat surface without the buccal extension. A successful operation should not only eliminate the excessive flabby tissue, but should leave well-defined borders high in the buccal fold.

An operation for this type of case does not differ materially from that for ridge extension, which has already been described, except that the excessive submucous fibrous tissue is carefully resected from the mucous membrane flap before the latter is sutured back to the buccal surface of the upper jaw. If it is found that the mucous membrane over the lower end of the flap is too long, a sufficient amount of tissue may be removed to produce a good fit. At times, it may be necessary to excise some of the bone from the nasal spine in order to gain sufficient height at that region at the median line. (Fig. 20.)

CASE 7.—S. M. had used a full upper denture for many years, and when it became necessary for her to have a new one, her dentist advised an operation for the reconstruction of the upper jaw. My examination showed that the upper alveolar ridges were greatly absorbed, especially in the anterior region, and the buccal groove had entirely disappeared. (Fig. 21*a*.) I advised an operation for ridge extension. A horizontal incision high in the buccal fold was made along the entire length of the tissue in question, and the mucosa with subcutaneous tissue was dissected from the

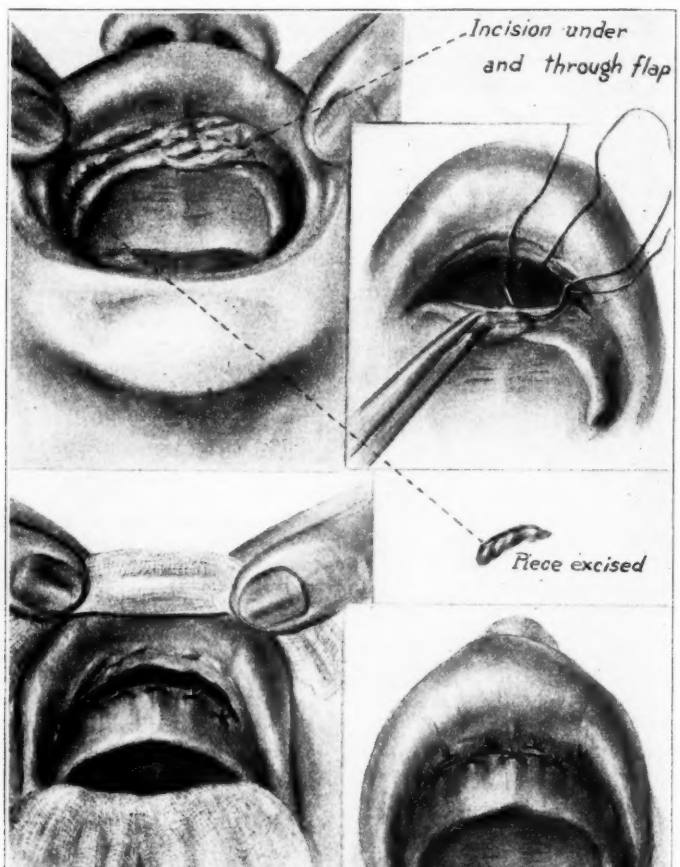

Fig. 22.—Various steps of operation for extension of hypertrophied fibrous tissue at anterior aspect of upper jaw combined with extension of adequate buccal ridge. (Compare Figure 20.)

underlying tissue up to the very edge of the ridge, a broad flap thus being made. All the excessive submucosa tissue from under the flap to the periosteum was removed, care being taken not to strip the periosteum. This allowed a vertical surface over the buccal aspect of the alveolar ridges to be covered with the mucous membrane flap already prepared at the beginning of the operation. In order to control the borders of the flap in its new position, as well as the upper border of the incision, I sutured them separately to the periosteum at the extreme end of the fold, and combined this

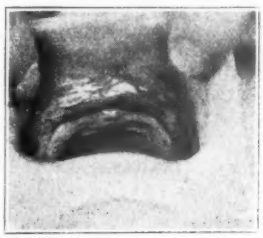

Fig. 23 (Case 8).—Hypertrophied tissue over buccal aspect of upper jaw.

Fig. 24 (Case 8).—After operation.

procedure with the use well up under the lip of a small flexible rubber tube, which was held in position with interrupted mattress sutures passed through the lip on to the face. (Figs. 21*b* and 22.)

Case 8.—This patient was referred to the Harvard University Dental School surgical clinic by her local dentist. Examination of the mouth showed a considerable amount of hypertrophied and well-defined fibrous tissue over the mucous membrane of the upper lip close to the buccal fold as seen in Figure 23. This tissue was entirely covered by the plate that she was wearing. The operation consisted of an incision along the folds of the fibrous mass. The fibrous tissue was dissected out from the mucous membrane and part of the mucous membrane utilized for extension of the ridge, while the remainder was excised. The result of the operation was quite satisfactory. (Fig. 24.)

Excessive Amount of Submucosa.—One of the essential factors in the retention of dentures is the texture of the mucous membrane of the ridges and palate. It is a most desirable condition to

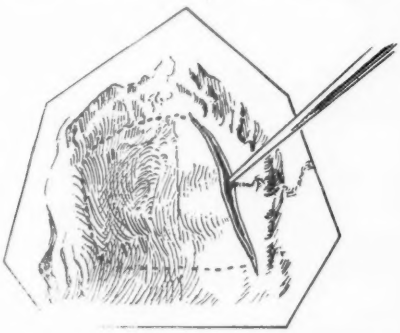

Fig. 25.—Operation for repair of subnormal tissue conditions of palate. A small incision is made on one side of the palate near the alveolar ridge. The mucoperiosteum is freely separated, which allows the blood to fill the space and organize.

have enough healthy mucous membrane supported by just enough subcutaneous tissue to give slight resiliency. Fortunately, this occurs in most instances, yet some cases present abnormal conditions requiring surgical interference.

On the lower jaw, one frequently meets a tough fibrous band extending along the top of the alveolar ridge. This band of tissue folds upon itself and, when force is applied, causes discomfort and pain. In constructing the denture, al-

lowances can often be made to relieve the pressure, but if this is not successful, it is advisable to excise the band of tissue, a procedure that leaves only a small raw surface, which heals quickly.

Occasionally the entire palate, as well as the alveolar ridge, is soft and mobile, owing to the presence of a superabundance of subcutaneous fat and areolar tissue. This is a type of rare abnormality which defies the ingenuity of the prosthodontist. Various mechanical measures have been tried to cause resorption and hardening, but the methods are long and tedious and, as a whole, unsatisfactory. A well-planned operation is the only remedy for such a condition. This consists of dissecting the mucous membrane and making a sufficiently large opening to remove all the fatty tissue. It is advisable to do the operation in stages, first on one side of the mouth and then on the other, and to supplement it with the adaptation of a biteplate immediately after such an operation, thereby securing a close contact between the mucous membrane flap and its base.

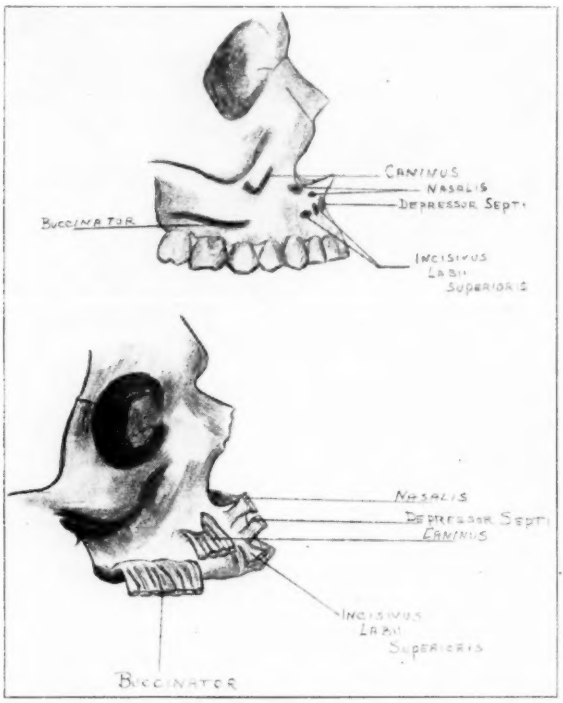

Fig. 26.—Attachments of various muscles of upper jaw which influence outline of buccal fold.

The converse of this condition is not infrequently encountered, when, instead of having too much submucosa, we have a hard unyielding surface, and the mucous membrane appears to adhere to the

bone; which allows no resiliency. In discussing this type of abnormality, House[1] says,

Subnormal tissue conditions and the entire denture area affords no resiliency for a valve seal action at the periphery of the denture owing to the fact that it affords no cushion effect and therefore is easily bruised and irritated under stress. Experience has proved such conditions to be treatment cases requiring from two to eight years' continuous wearing of vulcanite dentures for correction.

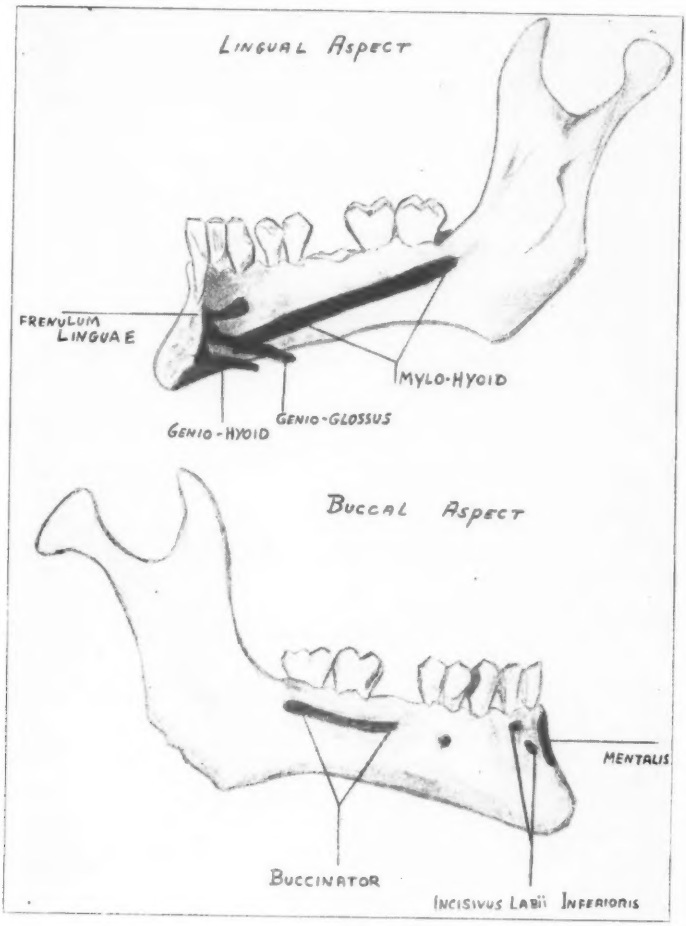

Fig. 27.—Attachments of various muscles to lower jaw which affect boundaries of alveolar ridges.

1. House, M. M.: Classification of Osseous, Muscular, and Tissue Conditions of Edentulous Mouths; Nichols, I. G.: Prosthetic Dentistry, St. Louis: C. V. Mosby Co., Vol. 2, pp. 90-91.

If I may quote from my past experience in this field, I should add that such subnormal tissue conditions give very poor retention of the denture. For a long time, the surgical treatment of this type of case puzzled me, until I recently evolved the following operation:

A small incision is made near the center of the ridge of one side. (Fig. 25.)

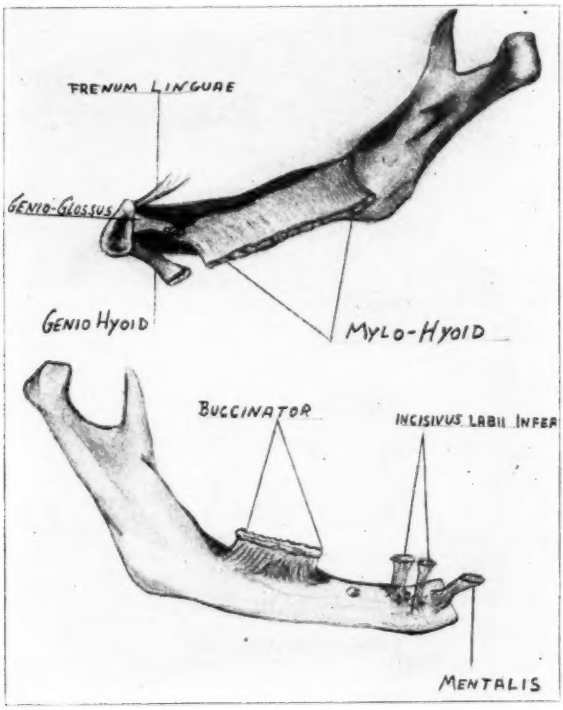

Fig. 28.—Attachments of various muscles to lower jaw which affect boundaries of alveolar ridges in edentulous cases.

With a periosteal elevator, the mucoperiosteum is separated from the palatal bone. The wound is sutured and blood is allowed to fill in between the bone and mucoperiosteum, which should organize and form fibrous tissue, thus adding to the resiliency of the surface. The same procedure is applied to the alveolar ridges. At least one month should elapse before impressions are taken for new dentures.

All these operations are more conveniently done under local anesthesia, although general anesthesia is not contraindicated if the operator should desire it. There is usually a moderate amount of swelling of the face following the operation, but it gradually subsides. Mattress sutures do not leave any mark on the skin surface if they are protected by a thin strip of gauze and are not sutured too firmly.

The boundaries of the resting area of

the artificial dentures are influenced by the various muscles of mastication and expression. Their attachments on the buccal, labial and lingual surfaces of the mandible and maxilla mark the beginning of mobile and active tissues. It is therefore important for the success of the various operations mentioned above to have a comprehensive knowledge of the various tissues with which we are dealing, especially the position of some of the muscles nearest to the alveolar ridges. The most important are, in the maxilla, the buccinator, which is attached to the tuberosity and the buccal plate of the alveolar processes of the maxilla opposite the molar teeth, and influences the boundary line of that area. The other muscles which make the anterior boundary are compressor nasi and depressor alae nasi, caninus and incisivus labii superioris. (Fig. 26.)

In the mandible, the following muscles, which are attached to the outer plate of the alveolar processes of the mandible, are also attached to the buccinator: depressor labii inferioris and mentalis.

The muscles attached to the lingual surface of the mandible and which influence the extension of the lingual borders of the lower denture are: mylohyoid, a few fibers of the buccinator muscle at the postmolar region, the genioglossus, the geniohyoid and frenum linguae. (Figs. 27-30.)

In operation for ridge extension, we have two alternatives: either to move the attachments of certain muscles higher up or to neutralize their action by cutting the fibers away from the periosteum and replacing them by a mucous membrane flap which adheres in the new position, a wider resting area resulting for the dentures.

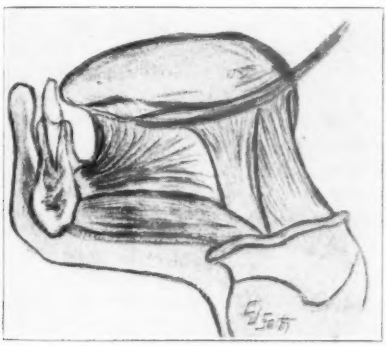

Fig. 29.—Attachment of genioglossus and mylohyoid muscles.

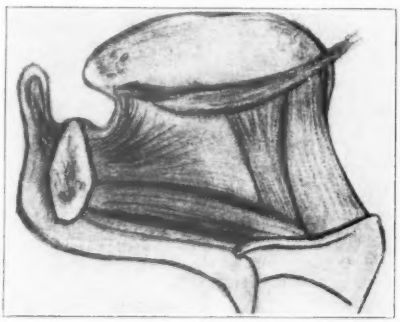

Fig. 30.—Attachment of genioglossus and mylohyoid muscles in edentulous cases.

The surgical treatment of mouth conditions which offer mechanical difficulties preventing the successful adjustment of artificial dentures is a comparatively new field, the possibilities of which we are just beginning to appreciate. It should be approached cautiously, as otherwise irreparable damage is quite likely to result. Yet the successes which have been achieved in this field lead us to view it with expectation, and if we proceed carefully in its development, we can accomplish much good.

CLINICAL PROSTHESIS AS APPLIED IN CASES OF ANOMALIES OF EDENTULOUS JAWS*

By R. O. SCHLOSSER, D.D.S., F.A.C.D., Chicago, Ill.

THE literature of orthodontia offers much descriptive text concerning irregularities of the teeth and jaws, while that pertaining to oral surgery furnishes us with unlimited information regarding the anomalies of individual teeth and malformations of the jaws, including such abnormalities as congenital cleft palate and associated and analogous deformities; yet, in a careful perusal of the Dental Index, I have succeeded in finding but meager references to anomalies of edentulous jaws. Neither have I been able to find much bearing on the prosthesis for this type of case.

My failure in this respect may be due to the fact that as yet my search has not been sufficiently diligent. It has occurred to me that one way in which I might obtain the information sought would be to start a discussion of this particular subject. In consequence, I have availed myself of the opportunity given me at this time. To add stimulus to this discussion and also in the hope of arousing interest in this matter, I have brought with me a collection of models of unusual cases that have been cared for at our clinic during the past few years, and have also arranged to show several patients.

The treatment given these cases from the standpoint of clinical prosthesis was very materially simplified by the application of the fundamentals of diagnosis and prognosis, and by the adherence to sound principles of clinical and laboratory procedure, the latter being of necessity varied or modified.

Among the more frequently encountered cases, we find a goodly number of a type showing an excessive degree of resorption of the alveolar ridges. There may be some objections to classifying these as anomalies, yet the amount of structure lost as the result either of disease or traumatization has, in these cases, created disfigurements so gross as to give them many aspects of abnormality. While it is true that most of these patients have lost their teeth because of pyorrhea and later have worn or rather tolerated ill-fitting artificial dentures for too long a period, and might, in consequence of advanced age and physical infirmities, make poor subjects on which to try one's art and skill, they deserve our consideration. Though we might, in our desire to render them a degree of comfortable service, fall short of getting the result we hope for, there is much satisfaction to be derived from a sincere attempt.

As in all cases, our objective in the treatment of these patients is to restore the lost facial dimensions and contour to a degree befitting the age of the individual, as well as to restore in reasonable measure the function of mastication, and to aid the function of speech. Because we have been able to do this in most of the cases of which we are showing models here, we have been greatly encouraged in

*Read at the Seventieth Midwinter Clinic of the Chicago Dental Society, March 1, 1934.

our efforts and therein find the urge to continue. Financial remuneration is of course among the consummations that may be wished for, devoutly or otherwise, and who is there in these troublous times that would turn down an honorarium? Yet I feel certain that, even in this day of many uncertainties, the thrill that follows the accomplishment of a difficult task well done has its own intrinsic value.

I shall now cite specific cases belonging to this group.

CASE 1.—A woman, aged 70, had worn ill-fitting full dentures for over twelve years. Both ridges showed excessive resorption, the maxillary ridge being also extremely flabby anteriorly. The muscular attachments were all very close to the residual crest.

The mandibular denture was very much underextended and the cusps of the teeth were all ground off. As a result of this and the resorptive changes, the occlusion was not balanced in any jaw relation. The only treatment given this case was the construction of a well-fitting set of dentures with a well-balanced articulation and subsequent routine adjustment service for a period of thirty days. The vertical dimension of the denture space was increased; which, with the needed restoration of lost contour, made a pleasing change in the patient's appearance. Though encountering some difficulty at first in managing the new dentures, the patient soon learned to use them effectively and to her entire satisfaction, and, several months later, she brought her husband and sister in as patients. The old dentures, as well as a duplicate set of the new ones, mounted on an articulator, illustrate some of the phases of this case very clearly.

CASE 2.—A woman, aged 68, wearing an upper and a lower denture, each padded with a layer of cotton about 5 to 7 mm. thick, reported having worn these cotton pads, which she renewed from time to time, for three years. A study of the models of this case reveals another instance of marked alveolar resorption. Many difficulties were encountered in the taking of impressions and in recording the positional relations. In spite of these difficulties, we succeeded in fitting the patient with dentures that she was able to wear with comfort, and sans cotton or other forms of padding.

CASE 3.—In this case, a type of patent suction device had been employed, which, instead of increasing the retention of the denture very much, produced a severe irritation of the mucosa of the palate. Though the denture space in the completed restoration showed a vertical dimension of 35 mm., the patient soon became adjusted to the change, and in spite of the fact that the dentures exhibited a marked resistance to displacement. The mounted casts of this case are shown.

It is admitted that the case histories of these three patients are somewhat meager. It must also be acknowledged that a certain amount of the resorption that had taken place was such as naturally follows the extraction of teeth, but it can hardly be denied that the excessive amount of resorption was largely due to conditions that might have been prevented by modern methods of denture prosthesis.

A second type of anomalies of edentulous jaws is that in which we find a marked discrepancy in the size of the opposing arches. These anomalies, while they are but the residual proof that the dentate arches presented analogous disproportions and associated irregularities of the teeth, often show an even greater disproportion in the edentulous state, owing, I believe, primarily to the manner in which resorption progresses after the removal of the teeth. I refrain from going too deeply into a discussion of the etiology of this type of abnormality; first, because it would lead us too far from the subject of clinical prosthesis and, secondly, the time at our disposal would not permit us to more than scratch the surface of so broad a subject.

In a general way, it may be said that

these cases are due to some form of disturbed development, either systemic or dental in origin, or in some manner connected with the endocrine glands. For the purpose of our study, they may be divided into several groups: (1) those marked prominences of the maxilla associated with an excessively receded mandible; (2) those showing extreme mandibular prognathism with a correspondingly deficient maxilla, and (3) those showing marked unilateral disharmonies. The question as to whether the condition is genetic or pathologic will as a rule not alter or affect the design of the dentures to be made, though even this rule like others may have its exceptions.

While it seems that the mandibular prognathous types are more often encountered than the orthognathous, we do find quite a number of the latter. In this connection, it might be well to mention

Fig. 1.—Above, left: Front view of patient without dentures; right: Appearance of patient with dentures in place. Below, left: Profile view of patient without dentures; right: Profile view of patient with dentures in place.

that some cases which are at first designated as prognathous are subsequently shown to be either normal or, worse yet, really orthognathous, the erroneous classification being due to an incorrect registration of positional relations. While cases in which the mandibular arch is in lateral relation are not so frequently met with as the others, we have seen quite a few of them, and because of their particular deviation from the normal, we have included models of several such cases in our present collection. I also

Fig. 2.—Occlusal view of edentulous casts from case shown in Figure 1.

have with me one or more patients of this type.

There is still another type. Into this group might be placed all other anomalies of edentulous jaws, either maxillae or mandibles, that are of special interest to us because of the peculiar character of their deviation in form from what we consider normal. In this part of our collection, we have the following: A maxillary case measuring but 29 mm. from the center of the right to the center of the left tuberosity; another maxillary cast measuring 60 mm. from similar points, a third maxillary cast showing a circular cleft of 35 mm. diameter. In the last case, there is perfect union of the soft palate. A fourth maxillary cast shows well developed contours of the alveolar ridge on both sides, but a severe contraction of the arch. The vault is very high and constricted, the median line having the appearance of a deep fissure, but no actual cleft. In still another cast, the abnormality consists of cicatricial adhesions on one side from about the bicuspid region and continuing back past the tuberosity to the hamular process. Also in this series, we

Fig. 3.—Mandibular denture showing teeth set in extreme buccal version on left side, from case shown in Figure 1.

have a sixth maxillary cast showing a rather prominent torus palatinus.

In mandibular casts, we often find distinctly individual deformities classification of which might defy an expert. Aside from those in which there is virtually a complete resorption of the alveolar ridge proper, we encounter many odd shapes. I have three or four particularly queer ones that may be seen after the reading of this paper. The first of these shows a very steep curve of the ridges in the vertical and sagittal planes. In the incisor region, the ridge is fairly promi-

nent, extending vertically about 6 to 7 mm. from the base. At the cuspid region, it begins to dip down sharply, while in the region of the first molar it is approximately 25 mm. lower than in the anterior region. From here, it curves upward abruptly, bringing the retromolar areas almost to the same level of the crest in the incisor region. It suggests an early loss of the bicuspids and first molars and, because of no replacement of these teeth, a drifting of the others toward each other, with the resultant curvature of the body of the mandible itself. This model was sent to me by one of our alumni.

The second mandibular cast shows us one of the most severe cases of resorption. There is a groove of considerable depth between the external oblique line and the crest of the mylohyoid ridge, the alveolar ridge proper being completely obliterated and this depression in its place. Digital examination showed the body of the mandible in the first molar region to be only about 6 mm. thick. This case, like many of similar category, was referred to me for clinical care by

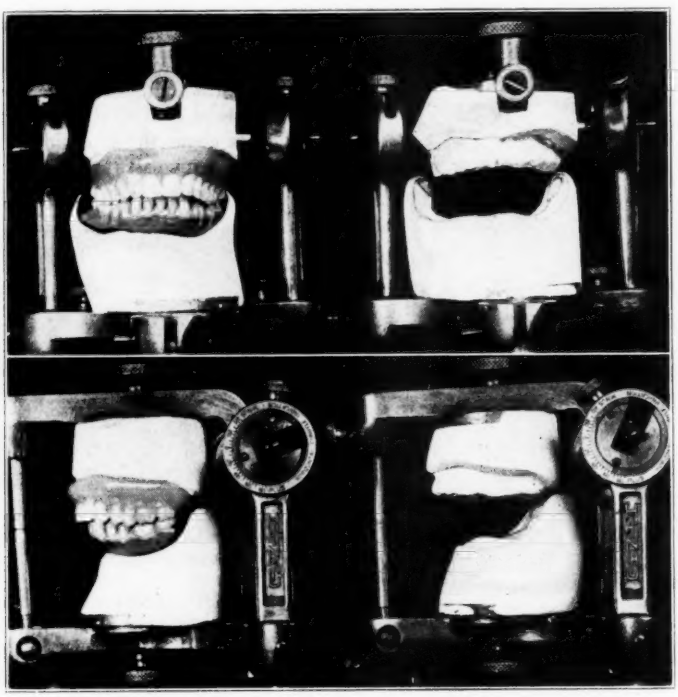

Fig. 4.—Above: Frontal view of dentures and edentulous casts. Below: Profile view of dentures and edentulous casts portraying extreme orthognathous ridge relation. (From case shown in Figure 1.)

one of the alumni of our school. The patient was quite pleased with the result obtained.

The third and by far the most spectacular mandibular cast in our collection is of a case of osteitis deformans. I will show you not only the models and slides of this case, but also the patient himself. The maxillary cast shows normal form and development. Owing to the deformity the symphysis is to the right of the median line of the face, and the crest of the residual ridge of the left side is in extreme lingual version. This can be best observed by studying the case as mounted on the articulator. While the slides enable one to get some idea of the magnitude of this deformity, the models portray it in a much better manner. More convincing than either slides or models is the opportunity to see the patient with the completed restoration. To us the result has been most gratifying because it shows how much may be done in such cases.

When this patient was about 8 years old, he had one or more alveolar apical abscesses. Owing to neglect of these, there was considerable bone involvement. From the scars left on the face, one can judge that, in time, liberal drainage was established. The end-result of this infection was marked shortening of the right half of the mandible. The patient first came to see me about fifteen months ago, being brought in by a member of our oral surgery department. As the case offered much in the way of clinical value, I decided to use it in certain lecture demonstrations before our students. I completed the dentures about thirteen months ago, the patient having worn them continuously. A recent checkup revealed but slight irritation in the region of the lingual frenum, which was easily alleviated. The patient reports that he can masticate virtually all sorts of food without difficulty, eating corn off the cob during the past summer. Test showed the articulation to be in good balance and the stability and retention of both dentures to be excellent.

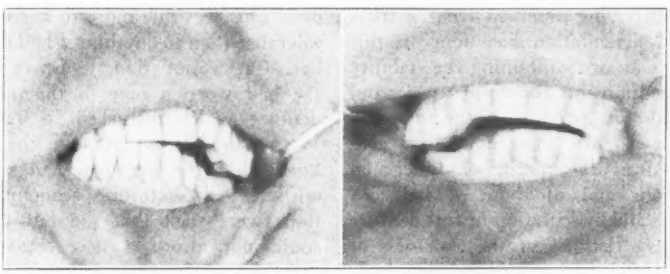

Fig. 5.—Left: Balanced occlusion in left lateral jaw relation. Right: Balanced occlusion in right lateral jaw relation. (Case shown in Figures 1-4.)

Owing to the extreme distal and lingual version of the mandibular ridge, it was necessary to set the lower incisors and cuspids labially from the ridge crest, while the bicuspids and molars on the left side were actually placed from 7 to 10 mm. buccally from the crest. Because of the extreme labial prominence of the anterior portion of the maxillary ridge, it was also necessary to set the upper anterior teeth directly under the ridge, in order to avoid an excessive overjet and

for better compliance with the functional requirements. In spite of these extreme deviations from the routine procedure of keeping the mandibular anterior teeth as close to the ridge crest as possible and setting the bicuspids and molars so that the crests formed by their buccal cusps would be in vertically parallel alinement with the mandibular ridge crest, we have had no tipping of either dentures because of undue leverages. This to me clearly demonstrates the significance and value of perfectly balanced, bilateral occlusion and three point contacts. Among my slides are several depicting the centric as well as the right and left lateral occlusion of this case.

I am all too cognizant of my limitations, yet having observed what a truly balanced articulation has done in this case, by way of maintaining the stability and retention of these dentures, and noting also its effect on tissue tone and muscular balance, I am more than ever convinced of the merits of functional impressions and of those of balanced occlusion and articulation in full denture prosthesis. Because of the shortness of this patient's upper lip and the excessively prominent ridge, we made the maxillary denture in resin, which seems to have stood up very well and, in this case, adds much to the appearance value. While I was engaged in the preparation of this paper, another case of quite similar deformity came into our clinic, differing somewhat from the one just described in that the left side of the mandible was the affected one. There was also more cicatricial tissue within the mouth and a very definitely restricted movement of the mandible toward the right side. The case was assigned to one of our graduate students and I hope as this is written that we shall be able to show it at this meeting with a complete history.

In our collection of cases, we still have quite a number of very interesting ones that could be reported. In one particularly odd case of a full maxillary denture and a lingual bar mandibular denture, the anomaly consists of a unilateral enlargement of the maxilla on the left side. One specially interesting feature of this case is the fact that the patient has returned for further service. About nine years ago, I was asked to make her some dentures. At that time, the abnormality was not nearly so pronounced as it is today, yet it was so unusual as to cause me to make duplicate models of it, which have since filled a niche in my departmental museum. To my surprise, the patient wore these dentures for nearly eight years before she reported any trouble. This was due more to her inherent tolerance than to anything I had done for her. On examination, I discovered that she had worn a hole in the maxillary denture which disturbed its retention. We repaired it, and though the patient knew that the dentures had virtually outlived their usefulness, economic conditions were such that she felt that she could not afford a new set. Several months ago, she again returned, and this time she was herself convinced of the futility of trying any more patchwork. We therefore undertook to build her new dentures.

Examination revealed the fact that there had been a very marked increase in the deformity. This can be clearly noted by studying the contrast of the models of nine years ago with those of the present. The patient has consented to be present here. She has worn the new dentures since early in January, during which time we have kept the case under close observation and have made several adjustments. These adjustments consisted mainly in checking changes in positional relation and regrinding the occlusion. As far as the patient is concerned, she

tells me that she is getting on quite well. As for myself, I am not praying for any duplicates.

In attempting to classify this case, I have consulted orthodontists, oral surgeons and even an endocrinologist. We are all agreed that it is an anomaly. The roentgenogram (regulation dental) indicated that the enlarged alveolar ridge is composed of compact normal bone. The endocrinologist suggested that it is perhaps merely a diffuse growth of bone, possibly a one-sided acromegaly. Slides and models show how greatly this case differs from the normal. Because in this case we were desirous of ascertaining if possible the full extent of the involvement, we have had several roentgenograms taken of the skull. These have been interpreted for us, but I am not prepared to discuss the possible relation of endocrine disturbances to this type of deformity at this time.

On examining the mouth, we find the mucous membrane of normal tone and color, with the exception of the anterior portion of the maxillary ridge on the right side, which is somewhat flabby. From the cuspid region back to the right tuberosity, the alveolar ridge is somewhat more than average size, but seems to have undergone only slight if any change during the past nine years; while, on the left side, the enlargement begins to be noticeable near the median suture and increases progressively in prominence buccolingually, vertically and posteriorly, extending about 25 mm. beyond the normal distal termination and downward so far as to leave but 2 or 3 mm. of space between the ridges in the molar region. The remaining natural mandibular teeth seem to have suffered little appreciable wear in the last nine years. Neither is much change noticeable in the edentulous portions of the lower ridge, as can be readily observed in the models.

Our attempt to increase the vertical dimension of the denture space sufficiently to accommodate the upper and lower molars was checked or limited, because an undue increase would have abnormally elongated the face and caused the maxillary teeth to be set too low for compliance with the esthetic, as well as the phonetic, requirements of the case. In consequence, the shortest possible molds were used and these had to be further modified by judicious grinding. To obtain a satisfactory impression, it was necessary to construct a special tray. The registration of positional relation was also complicated because of the deformity, as well as on account of the wearing of the old dentures long after the articulation had become unbalanced. Since the new dentures were inserted, they have required considerable adjustment. At the present time, they seem to be functioning quite well. It is our hope that they will, because of the better adaptation of their bases and the better balanced articulation, help to keep the conditions in check for a considerable time. When the marked contrast between today's models and those of nine years ago is noted, it must be acknowledged that it would be unwise to predict specifically just what may occur in the future. Our plan is to continue to keep the case under close observation and to make periodical checks so that we may record whatever changes may take place. For the present, we have the patient's word that she is highly pleased with the esthetic result obtained and is able to masticate her food with a reasonable degree of comfort. As far as we are able to judge, she has no speech difficulty. To carry out her part of our agreement, the patient is presented here, enabling those who care to to view the case at close range. In all, there are six patients present, each showing conditions of distinctly individual char-

acteristic deviations from the normal.

I shall conclude with an outline of the clinical and laboratory prosthesis for the different types of anomalies discussed.

In Group 1, extensive resorption of the ridges has occurred. For these, as for all cases, in fact, we obtain the best possible preliminary impression, which we use for making suitable study models. On these models, we outline the area of the denture bases with an indelible pencil. Next, we select the most suitable impression trays available, and modify their form to more fully comply with the particular individual requirements. We are governed by our findings as revealed by the diagnosis, as far as this applies to the jaw form, size, ridge contour and position of muscular attachments along the labial, buccal and lingual borders of the alveolar ridges, and specifically the deviation of any or all of these factors from the normal. The trays, when prepared, are carefully checked for compliance. Particularly in these cases where there has been so much loss of the ridge structure do I find the functional impression method possessed of special advantages. This, because of the very nature of the technic, assures us of getting the maximum extensions of surface area for the denture bases, allows for the more or less automatic establishment of correct flange height and aids in the development of a peripheral form most conducive to the comfort of the supporting and adjacent soft tissues. The carrying out of certain steps of impression work with the aid of rims in good occlusion, and which, at least relatively, restore the normal dimension of the denture space, permits the muscles engaged in the procedure to mold the inner surface of the impression, the flanges and the periphery in fuller compliance to their functional needs. Casts and baseplates are next made. For the latter, my preference is for vulcanite baseplates, because of their rigidity of form, which permits one to check their stability and retention and make corrections, if need be, to perfect these. More satisfactory results are possible than if baseplates of shellac resins are employed, this being particularly true in registering positional relations; but they also possess distinct advantages as bases for the model dentures during the setting of the teeth and at the time of trying in.

In determining what may constitute an acceptable vertical dimension of the denture space for any of these cases, the trial and error method, with proper consideration of the cosmetic and functional requirements, should be carried out. Allowance must be made for the age of the patient. It will often be found best to be content with something less than complete restoration of facial length and contour for the sake of greater functional efficiency. It is always better to work out the details of restoration before registering the positional relations. Thereafter, the case is mounted on the articular and the routine procedure of setting up the teeth, trying in the model dentures and the finishing and inserting the completed dentures is carried out; after which these cases should be kept under observation, necessary adjustment services being rendered for a somewhat longer period than the ordinary cases require. Prosthesis for the second group in which we have placed those cases and in which we find the prognathous, the orthognathous or those with the mandibular ridge in lateral version, requires, beyond the technic outlined for the first group, a sort of compromise in the arrangement and setting of the teeth. For the prognathous, the compromise consists in setting the maxillary teeth as far labially and buccally from the ridge as our judgment of the mechanical needs and the esthetic requirements of the case will permit; the mandibular teeth being

in turn set as far lingually from the crest of the ridge as possible, avoiding impingement on the free movement of the tongue or other impediment to clear speech. The crossbite setup is used by many for this type of case, apparently with very satisfactory results. I have always felt that a more pleasing esthetic result is obtained by refraining from the crossbite arrangement.

The orthognathous type of case is, in my opinion, the most difficult of all types when it comes to the setting of the teeth. This applies especially to the extreme cases. Aside from excessive prominence in the maxillary ridge with a corresponding deficiency of the mandibular arch, we usually find short thin upper lips and very heavy lower lips with the associated receded chin. In these cases, we begin by setting the maxillary anterior teeth in, under the ridge, as far as the maintenance of lip contour and function will allow. The mandibular anterior teeth as well as the bicuspids and molars are in turn set out as far out from the ridge as possible within the range of tolerance. Just how far this may be in some cases can be noted in the case of osteitis deformans, where it was necessary to place the mandibular teeth from 8 to 12 mm. externally from the residual ridge crest. It must not be forgotten that the muscles of speech require that the habits which they have acquired through long association with the natural teeth now lost must be taken into consideration when the overbite and overjet for the artificial teeth is being established. All that need be said in addition to the foregoing about those cases in which lateral version of the mandibular ridge exists is that a corresponding compromise arrangement of the teeth must be worked out.

Because all of these cases present unusual phases of the various problems involved in denture construction, each step in the procedure should receive special attention, and to no single step is this applicable more than to the trying in of the model dentures. It is at this stage that a most careful check-up of the jaw relations, the facial expression and general appearance, as well as a thorough test of phonetic values, should be made. Corrections are far easier to make now than after the dentures have been finished. After the trying in has been completed to the satisfaction of both the operator and the patient, routine procedure is in order.

As for the method of obtaining impressions of abnormally large or small cases, or those peculiarly deformed, there is, in my opinion, no better way to proceed than by the employment of study models as an aid to better preparation of individually fitted trays. This may include the modification of the regulation stock trays as we obtain them from the dealer, the use of wax or modeling compound impressions as a base for a plaster wash or other form of lining impression, the molding of trays out of resinous shellac or vulcanite or the casting after wax models made over the study casts.

CONCLUSION

Clinical prosthesis in edentulous anomalies need not of itself be more difficult than that for normal cases, provided the elementals of sound diagnosis, prognosis and practical laboratory and chair technic and procedure are understood and applied.

A SYSTEMATIC METHOD FOR THE TREATMENT OF HYPERSENSITIVE DENTIN

By LOUIS I. GROSSMAN, D.D.S., Dr. med. dent. (Rostock), Philadelphia, Pa.

IN this paper, an attempt is made to systematize a method for the treatment of hypersensitive dentin. I am well aware that this method is still imperfect. Some may even find nothing new in it. But just as one sets off a painting with a suitable frame and makes it stand out more effectively, so shall I attempt to frame or embellish some already known methods so as to make them more effective than they now are. I regret that those of you who had expected to hear of a newly discovered drug, the mere application of which would forever banish the hypersensitiveness of dentin, will be disappointed. I shall offer only certain refinements in technic, but refinements which may change an otherwise ineffective treatment into an effective one.

Let us first agree as to what we mean by hypersensitive dentin. It will be said by some that there is no such thing as hypersensitive dentin, that dentin is insensitive, and that the hybrid term "hypersensitive" should be outlawed from dental usage. I am mildly in accord with the last contention. The term "hypersensitive dentin," however, has come to mean something in dental terminology which cannot be described by any other word except, possibly, "hyperesthetic," which is no better. Why may we not refer to those exceedingly sensitive areas on the exposed dentinal surface as hypersensitive areas, just as, under certain circumstances, we speak of hyperesthetic areas on the surface of the body? As to the contention that dentin is insensitive, and therefore cannot be hypersensitive, it must be remarked that dentin freshly exposed by trauma is insensitive only at first and that it does become sensitive shortly after it has come in contact with the fluids of the mouth. Further, the highly sensitive character of the dentin is demonstrated too forcibly in daily practice to require any elucidation.

What, then, is hypersensitive dentin? Hypersensitiveness in dentin denotes an uncommonly sensitive or painful response of the exposed dentin to an irritation. This statement includes dentin exposed by caries, attrition, abrasion or erosion, by failure of the enamel to meet the cementum and by marked atrophy of the alveolar process, exposing both dentin and cementum. The stimulus or irritant may be thermal, chemical or mechanical. Regardless of the nature of the stimulus, the response is always that of pain. The more common stimuli which elicit a painful response from exposed dentin are cold, sweet, sour and the touch.

REACTION OF EXPOSED DENTIN TO STIMULI

Generally speaking, teeth will not react painfully to temperatures between 50 F. (10 C.) and 120 F. (49 C.). Teeth with hypersensitive dentin react to more or less sudden changes of temperature and to cold. Even a temperature of 65 F. (18 C.), which is several degrees above the normally low threshold of stimula-

tion, will evoke a painful response. Heat is borne much better, so that even the upper temperature limit can be tolerated without pain. A rapid change from heat to cold (or vice versa), which so often occurs during eating or in going from a warm to a cold place, will often produce a sudden, severely painful reaction.

Of the chemical stimuli which affect hypersensitive dentin may be mentioned citrus fruits, berries, acid foodstuffs such as tomatoes or rhubarb, vinegar, candy, sugar, salt and other condiments, and many raw and cooked foods.

periods of lowered vitality, during mental distress and especially during infections of the head and upper respiratory tract. At times, there are also peculiarly pronounced exacerbations during the change of seasons. Whether these attacks are due to a change of dietary, which usually accompanies seasonal changes, or whether they are to be explained entirely by changes in atmospheric conditions, we have not been able to determine. Pronounced attacks have also been noted occasionally during the menstrual period and during pregnancy.

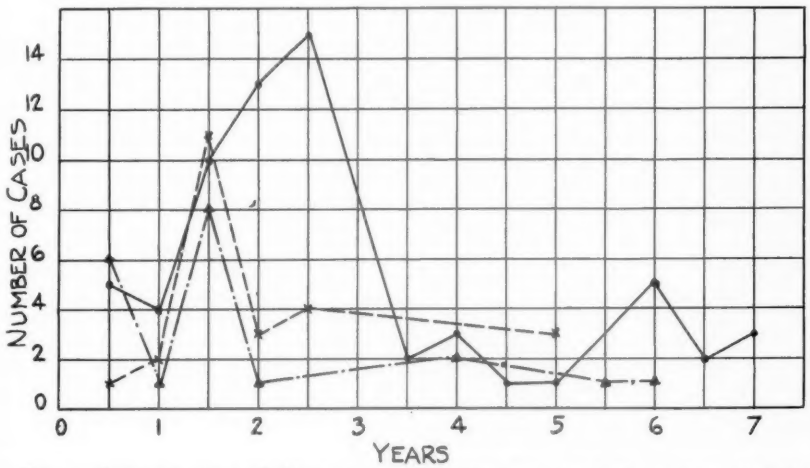

Fig. 1.—Graph showing individual cases treated with ammoniated silver nitrate, formalin or sodium-potassium carbonate and effectiveness of each of these medicaments.

Often a patient will complain that the tooth is sensitive only when touched with a finger nail, or in brushing the teeth, or even when pressure is exerted by the tongue against the affected area of the tooth. In such cases, an examination may disclose a lack of union of cementum with enamel, exposing a narrow strip of dentin.

Reactions of the dentin to external influences are more pronounced during

HISTOLOGIC EXPLANATION OF HYPERSENSITIVENESS OF DENTIN

What is the histologic explanation of hypersensitiveness of the dentin? There are two interpretations of the mechanism by which the irritant or stimulus is conveyed to the pulp and which ultimately causes the painful response. One group, composed chiefly of Morgenstern,[1] Dep-

1. Morgenstern: Deutsche Monatschr. f. Zahnheilk., 10:436, 1892; 14:111, 1896.

endorf,[2] Mummery,[3] Tojoda,[4] Adrion[5] and Dieck,[6] believes that neurofibrils are present in dentinal tubules, stimulation of which causes the sensation of pain to be registered by the sensorium. Mummery claims to have demonstrated "the actual passage of nerve fibers, from the nerve trunks of the pulp into the dentinal tubes." There is some evidence, which needs additional verification, that the neurofibrils are amyelinic and that they originate from the myelinic nerves of the pulp. In their passage from the pulp to the dentino-enamel junction, they not only surround and enclose the dentinal fibrils, but also give off ramifications which run through the body of the dentin.

The other group, which probably comprises the majority of dental histologists, denies the existence of nerve fibers in the dentinal tubules. Their explanation of the sensitiveness of dentin is based upon the ability of the dentinal fibrils to transmit impulses to the pulp. Several views are held as to the actual mechanism by which the impulse reaches the pulp. Walkhoff[7] believes that the stimuli are transmitted from the periphery of the tooth to the pulp by the protoplasm composing the dentinal fibrils. Hopewell-

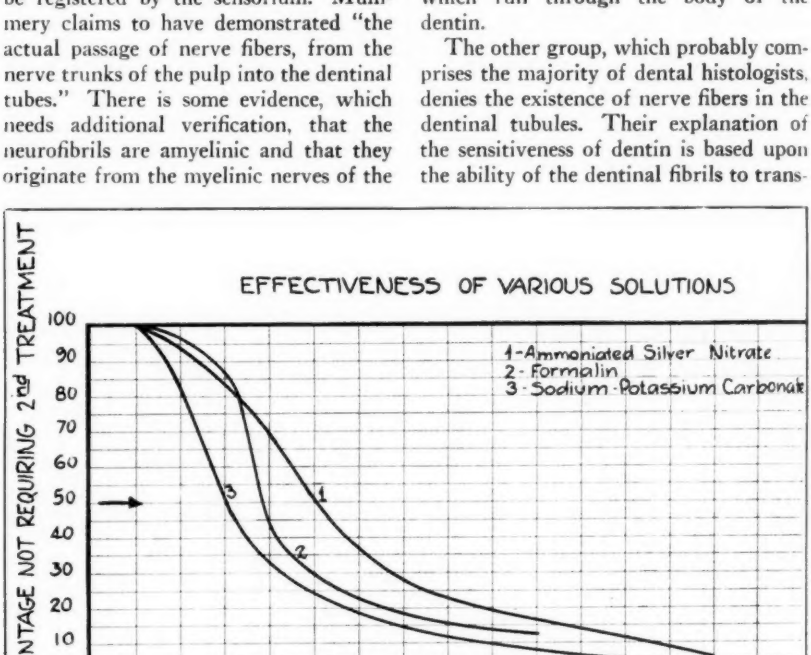

Fig. 2.—"Probability" curve showing relative effectiveness of amoniated silver nitrate, formalin and sodium-potassium carbonate; based upon data given in text.

2. Dependorf, T.: Deutsche Monatschr. f. Zahnheilk., 31:689, 1913.

3. Mummery, J. H.: D. Cosmos, 58:258 (March) 1916.

4. Tojoda, M.: Korr. f. Zahnärzte, 1926, pp. 50, 374.

5. Adrion, quoted by Orban, B.: Dental Histology and Embryology, Ed. 2, Philadelphia: P. Blakiston's Son & Co., 1929, p. 56.

6. Dieck, Wilhelm: Korr. f. Zahnärzte, 1927, pp. 51, 138.

7. Walkhoff, O.: Deutsche Zahnheilk, 1923, p. 60.

Smith[8] traced the stimulus "through the dentinal fibrils, odontoblasts, arborisations of amyelinic telodendria to the myelinic nerve fibers of the pulp." Gysi's[9] explanation is that, on stimulation of the exposed dentinal surface, a wavelike motion is set up in the dentinal fibrils. Since the fluid matter in the fibril is incompressible, the resultant motion is conveyed to the pulp, where excitation of the sensory nerves occurs. Prinz[10] explains the reaction on the basis of physiochemical influences, which alter the surface tension, adsorption or diffusion of

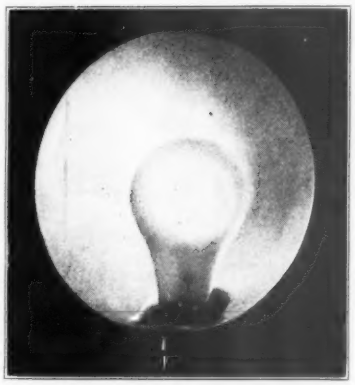

Fig. 3.—Photoflood lamp mounted in reflector. This lamp is not only useful for reducing silver nitrate, but can also be used as a light source for bleaching teeth, for locating root fragments in the posterior part of the mouth, in photomicrography, etc.

the contents of the dentinal tubules. Churchill[11] believes that since the odontoblastic extensions are protoplasmic, they share the property of irritability in common with living protoplasm. A change of any kind on the surface of the exposed dentin will lead to irritability of the cytoplasm in the dentinal tubules. This reaction of the cytoplasm is conveyed to the mother cells, i.e., the odontoblasts, and from there to the sensory nerves of the pulp. Still others ascribe the sensory phenomena to changes in osmotic pressure. In the face of so much diversity of opinion, the question of the innervation of dentin must be held open for consideration. Whether we subscribe to the view of one group or the other, we are all agreed that the reaction to the stimulus is always one of pronounced pain.

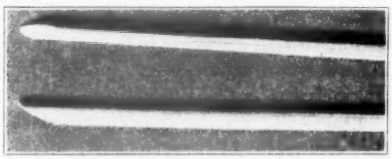

Fig. 4.—Young's beveled prophylactic orangewood sticks, which are very useful for applying medicament with pressure.

How shall we eliminate this pain? Let us review some of the preparations that have been used toward that end. A partial list of the more common measures would include: (1) arsenic trioxide, sealed in overnight; (2) paraformaldehyde, in the form of a paste or incorporated in a cement; (3) zinc chloride, either in solution or crystals mixed with a cement; (4) carbonic acid, in the form of a spray or stream; or the application of one of the following drugs either alone or combined with another; namely, (5) trichloracetic acid; (6) benzyl alcohol; (7) phenol; (8) oil of cloves; (9) potassium hydroxide; (10) silver nitrate; (11) formalin; and, finally, (12) potassium-sodium carbonate.

8. Hopewell-Smith, Arthur: Normal and Pathological Histology of the Mouth, Ed. 2, Philadelphia: P. Blakiston's Son & Co., p. 165.

9. Gysi, Alfred: Schweiz. Vierteljahrsschr. f. Zahnheilk., 1901.

10. Prinz, Hermann: Diseases of the Soft Structures of the Teeth, Philadelphia: Lea and Febiger, 1928, p. 87.

11. Churchill, H.: Personal communication to author.

REQUIREMENTS OF A MEDICAMENT FOR HYPERSENSITIVE DENTIN

From this diverse array of drugs, it can readily be seen that the ideal drug for the treatment of hypersensitive dentin has not yet been found. What are the requirements of a drug for this purpose?

1. It should not unduly irritate or in any way endanger the integrity of the pulp.
2. It should be relatively painless on application or shortly afterward.
3. It should be easily applied.
4. It should be rapid in its action.
5. It should be permanently effective.
6. It should not discolor tooth structure.

No remedy has yet been found which satisfies all these requirements. For this reason, certain drugs are indicated for use under certain conditions. These will be considered later.

Practically all the remedies used for the treatment of hypersensitive dentin are caustics. On contact with vital tissue, a chemical reaction occurs, resulting in destruction of the tissue. Solvents of organic tissue, such as solutions of potassium or sodium hydroxide, and non-self-limiting drugs, such as zinc chloride, paraformaldehyde and arsenic trioxide, have also been used, but these agents are dangerous because they may encroach on the pulp and destroy it.

We shall not discuss the treatment of hypersensitive dentin commonly found in carious cavities other than to mention that a glycerinated solution of phenol and potassium hydrate as suggested by Robinson more than fifty years ago,[12] or camphorated validol as suggested in a recent paper by Bödecker and Applebaum,[13] are generally useful for this purpose. Or else the cavity may be prepared under local anesthesia; in which case, it is advisable to seal the cavity with a temporary filling for a few days before filling it permanently. I shall limit myself to a consideration of exposed hypersensitive dentin not associated with definitely developed caries. This will include hypersensitiveness of exposed necks of teeth, of areas of dentin exposed between enamel and cementum, and of decalcified areas, and hypersensitiveness due to erosion,

Fig. 5.—Rubber dam applied so that necks of teeth remain exposed to action of medicament. Only two ligatures keep the dam in place, and even these can be dispensed with at times.

abrasion or attrition. For the treatment of such hypersensitive areas, I have limited myself to the use of the following drugs: (1) silver nitrate, (2) formalin, or (3) sodium-potassium carbonate. In general, the technic may be divided into three parts: (1) preparation of the tooth or teeth to be treated; (2) application of the medicament; (3) protection of the hypersensitive area.

12. Robinson, J. A.: D. Items Int., 6:617 (Nov.) 1884.
13. Bödecker, C. F., and Applebaum, E.: D. Cosmos, 73:1008 (Oct.) 1931.

PREPARATION OF THE HYPERSENSITIVE AREA

The preparation of the tooth as it is ordinarily carried out before application of the medicament is inadequate. Usually, the débris on the affected area of the tooth is wiped off with a pledget of cotton and the medicament is then applied. On reflection, we can readily understand why, under such circumstances, the treatment is ineffective. While the grosser particles of food débris are removed from the surface, there remains a thin coating of mucin and fatty débris which occludes the dentinal tubules. This coating prevents penetration of the drug and so defeats its purpose. It is therefore necessary to rid the dentinal surface of any coating so as to expose the numerous dentinal fibrils to the action of the medicament. This can best be done by thorough cleansing of the tooth surface with pumice paste. I prefer a coarse abrasive such as pumice, which washes away readily and the particles of which are too large to clog the dentinal tubules, to a fine abrasive such as chalk, which is more closely adherent to the tooth surface and may choke the orifices of the dentinal tubules.

After thorough cleansing with pumice, the teeth should be thoroughly syringed or sprayed with warm water to wash away the abrasive and any remaining foreign matter. Thereafter, the tooth or teeth should be isolated under a rubber dam or with cotton rolls. When the rubber dam cannot be used and there is much saliva, the patient should be given one-hundredth grain of atropine sulphate three hours before treatment. The dose should be repeated in one and one-half hours. This will inhibit secretions and help to keep the field of operation dry. The tooth to be treated is then thoroughly dried with cotton and warm air and the exposed dentinal area is swabbed thoroughly with a benzyl alcohol-chloroform solution, equal parts of each, or else with benzyl alcohol followed by chloroform. The alcohol dehydrates and anesthetizes the tooth surface. The chloroform dehydrates the tooth surface and dissolves any fatty matter which may be present, unhindered penetration of the medicament into the dentinal tubules being thus permitted. Recently, evidence has been accumulated that fat is normally present in dentin. (Weber,[14] Euler and Meyer,[15] Bödecker.[16]) If this is true, the application of chloroform to dissolve out the fat is especially indicated. After this preparation of the tooth, the dentinal surface is ready for the application of the medicament.

TECHNIC OF MEDICATION—SILVER NITRATE

Let us first consider the use of silver nitrate. Where is it indicated? It can be used in posterior teeth on the cementodentinal surfaces which have been exposed by gingival and alveolar atrophy; on the lingual surfaces of anterior teeth; and on abrasion or erosion areas on the buccal or labial surfaces of teeth, provided there is no esthetic objection. Silver nitrate should not be used where only a thin layer of dentin covers the pulp because it may penetrate into the pulp and destroy it. It should also not be used wherever its decided black stain is objectionable.

Silver nitrate is the most effective drug for the treatment of hypersensitive dentin. It produces its effect by causing a superficial destruction of the protoplasm in the dentinal tubules. At the same

14. Weber, R.: Deutsche Monatschr. f. Zahnheilk., 48:1489, 1930.

15. Euler, H., and Meyer, Wilhelm: Pathohistologie der Zähne, Munich: J. F. Bergmann, 1927.

16. Bödecker, C. F.: J. D. Res., 11:61 (Feb.) 1931.

time, it forms a more or less solid precipitate, the effect of which is to shut off the dentinal fibrils from external irritation. Its penetration is not deep, since silver nitrate is self-limiting in its action, but is nevertheless sufficient to be effective. It is a pronounced caustic by virtue of its nitrate radical, which being ionized on contact with organic matter, produces nitric acid. This reaction accounts for the yellowish to brownish discoloration of the dentin soon after silver nitrate has been applied. Simultaneously, on application of silver nitrate, the silver ion combines with the protoplasm in the dentinal tubules, forming silver albuminochloride. On reduction, this double salt is changed to silver oxide, a black precipitate.

Ammoniated silver nitrate is preferable to a plain silver nitrate solution because it is more readily reduced. It is prepared by adding to a saturated solution of silver nitrate U.S.P. enough concentrated ammonia water, U.S.P., until the solution becomes turbid, then clears again. The ammonia water should be added slowly, drop by drop, and discontinued the instant the solution becomes clear, since an excess of ammonia is undesirable and will again produce a turbid solution.

Reduction of the silver nitrate may be accomplished by exposure to light, heat or chemicals. I prefer exposure to strong light followed by application of eugenol. For a concentrated source of light, a photoflood lamp mounted in a reflector, such as is used in photographic work, is highly recommended. This lamp has a capacity of from 750 to 1,000 watts and gives an even, diffuse, strong light simulating daylight. While the light is being concentrated on the teeth, it is advisable that the patient's eyes be shielded from the strong glare. Also because of the heat given off during incandescence, the source of light should be held about 1 or 2 feet away from the patient's face. In treating posterior teeth or distal surfaces of teeth, the light can be reflected by a mouth mirror. In about one minute, the silver becomes sufficiently precipitated from the silver nitrate solution to stain the tooth a light yellow.

In practice, after the teeth have been suitably prepared and the hypersensitive area is ready for medication, a small pledget of cotton moistened with ammoniated silver nitrate is applied to the sensitive area. This is exposed to light for at least one minute. A small pledget of cotton moistened with eugenol is then applied to the affected area for about one or two minutes. It may be necessary to repeat this precipitation with eugenol two or three times because the eugenol becomes neutralized and has to be renewed and, incidentally, because the pledget of cotton becomes black and unsightly from use. When the dentin turns a deep black, the area is thoroughly dried with cotton and warm air and is now ready for the third part of the treatment. A saline solution should be on hand to neutralize any silver nitrate which may have come in contact with the gum tissue.

It might be mentioned here that, in a few stubborn cases, which did not respond to silver nitrate treatment as outlined above, a satisfactory result was obtained when formalin was used as the reducing agent instead of eugenol. In one case, this procedure was attended with so much pain that the treatment was eventually performed under block anesthesia. Formalin should not be used as a reducing agent if the dentin over the pulp is thin, because of its potential destructive action.

FORMALIN

On the exposed surfaces of anterior teeth and where, for esthetic reasons, a

nonstaining medication is desired, formalin is the medicament of choice. It is particularly indicated in hypersensitive decalcified areas not requiring filling, on the labial surfaces of anterior teeth; in abrasion or erosion cavities which are not deep; where considerable "grinding to occlusion" has exposed the dentin, and where the enamel and cementum fail to meet, the dentin being thus exposed. Formalin should be used preferably in those cases wherein the teeth can be placed under the rubber dam so as to protect the gingival tissue from its irritant and destructive action. It should not be used where the dentin covering the pulp is thin, in deep erosion cavities or in cases of marked attrition in which it may endanger the pulp.

Formalin is a powerful irritant and is not self-limiting in its action. It should therefore be used with great care. It is a solution of formaldehyde gas, which it liberates slowly. On prolonged standing, especially in a cold place, formalin becomes cloudy owing to separation of paraformaldehyde. The solution should therefore be preserved in a moderately warm place. Formalin is extremely destructive to living tissue. Even weak solutions are irritating to mucous membranes and strong solutions are irritating to the skin. In a more or less concentrated solution, it will precipitate albumin. Concentrated solutions are sometimes used as a caustic for removing warts, moles, etc. It is supposed that formalin, by virtue of its action as a protoplasm poison and caustic, cauterizes or destroys the contents of the dentinal tubules for some distance and incidentally hardens the tissue. Paraform, a solid polymer of formaldehyde, has sometimes been used in the form of a paste or has been incorporated in a cement to relieve hypersensitiveness of the dentin. Its effect cannot be controlled and it may eventually destroy the pulp. Several cases are on record wherein desensitizing compounds containing paraformaldehyde have acted so thoroughly as to desensitize not only the dentin but the pulp as well. Formalin is relatively safe because it is in contact with the dentin for only a short time.

Formalin is preferably applied with an orangewood stick which has a beveled edge like that of a hypodermic needle. Those put up by Young for prophylactic work are especially suitable for the purpose. The beveled edge of the stick is dipped in formalin and carried to the hypersensitive area, where the formalin is rubbed into the exposed dentinal surface. In addition to promoting a more intimate contact of the formalin with the dentinal fibrils, a certain amount of warmth is probably created by the act of rubbing, which may facilitate penetration of the drug. This rubbing or burnishing of the medicament into the tooth should be continued for about five minutes. In those areas wherein it is not possible to use an orangewood stick, penetration may be facilitated by a blast of warm air from a chip blower.

The gingival tissue is best protected from the action of formalin by a rubber dam. The holes in the rubber dam should be small and slightly nearer together than usual. This will tend to stretch the dam when it is applied and make a thin protective sheet. The smaller holes will hold the dam tightly around the teeth. Ligatures should be run between the teeth to fix the dam in position, but no ligatures need be used to tie the dam in place unless they will not interfere with the application of the medicament. An explorer is often helpful in tucking the edge of the dam around the tooth and invaginating it into the gingival crevice. The dam should be examined for seepage around the teeth before

application of the formaldehyde solution.

It is admitted that the rubber dam cannot always be so applied as to leave the hypersensitive area exposed to the application of the medicament, whether it be formalin or silver nitrate. In such cases, it is advisable to coat the gingiva either with a varnish or with vaseline. We have tried to protect the gingiva by laying a festooned piece of dryfoil over it, but this has not proved very satisfactory. Owing to imperfect contact, the most vulnerable area—the marginal gingiva—was exposed to the formalin and a slight sloughing of the gum was noticed afterward. If a varnish is used, the gingival tissue must first be thoroughly dried; otherwise, the varnish will not adhere. After the formalin is applied and the treated area is properly protected, a procedure which will be discussed later, the gingiva should be washed lightly with ammonium acetate solution U.S.P. This is a colorless, neutral liquid which will neutralize any formalin that might have come in contact with the gingival tissue. While it will lessen the irritation from formalin and reduce sloughing of the tissue to a great extent, it will not entirely prevent it if much of the solution has remained in contact with the gum tissue for several minutes. In this respect, the application of ammonium acetate to neutralize the caustic effect of formalin resembles that of alcohol to neutralize phenol.

SODIUM-POTASSIUM CARBONATE

Sodium-potassium carbonate in the form of a paste was suggested by Prinz about ten years ago. It does not stain tooth structure. It is a dehydrant and mild caustic and is indicated especially in those cases in which the dentin protecting the pulp is relatively thin, since it does not penetrate deeply. It may be used especially in hypersensitiveness due to attrition, erosion or abrasion, and where a relatively nonirritating caustic is desired. It is contraindicated in those areas of the mouth where it cannot be burnished over the exposed dentin with an engine burnisher or an orangewood stick. It does not lend itself for use so readily in desensitizing dentin exposed between cementum and enamel or in distolingual or distobuccal areas of teeth. Because of its mildly caustic effect, it is not so important to protect the gingiva with a rubber dam.

Both sodium carbonate and potassium carbonate are mild caustics and will abstract moisture from dentinal tubules. The sodium-potassium carbonate paste is made by triturating in a mortar sodium carbonate crystals (1 part) with potassium carbonate crystals (4 parts). Sodium carbonate, C.P., comes in colorless, transparent, efflorescent crystals which have a strongly alkaline taste. In making the desensitizing paste, only the crystalline form should be used. Anhydrous sodium carbonate or monohydrated sodium carbonate, both of which are white powders, are unsatisfactory for the purpose. Potassium carbonate U.S.P. is a white, granular, odorless powder which has a strong alkaline taste. While it is a stronger caustic, it is also more irritating than sodium carbonate. On trituration of the crystalline sodium carbonate with the powdered potassium carbonate, the mass will deliquesce and form a paste. After a few drops of glycerine have been added, this should be preserved in a well-stoppered bottle. When the hypersensitive area has been properly prepared, a bit of the paste is placed on the affected surface. The paste is then burnished with a smooth engine burnisher. This is preferable to a hand burnisher since, by the rapid rotation of the revolving burnisher over the surface of the tooth, warmth is created, which facilitates penetration of the drug.

Also, more pressure can be exerted, which helps to bring about a more intimate contact of the drug with the exposed dentinal surface. After about five minutes of burnishing, during which time intervals of rest must be allowed so as not to overheat the tooth, the area is dried with cotton and a protective varnish is applied.

PROTECTION OF HYPERSENSITIVE AREA

This leads us to a discussion of the third part of the method; namely, protection of the hypersensitive area. It has been observed that when a protective medium such as a varnish is applied to the hypersensitive area immediately after medication, a more certain desensitizing effect is obtained. Whether the varnish fixes a minute quantity of the medicament to the dentinal surface and thus prolongs the action of the medicament, or the varnish merely reduces irritation of the dentinal fibrils because of its insulating character, I am not prepared to say. Perhaps it does both. It is conceivable that a varnish applied to a hypersensitive area might hold the residue of the medicament—a minute quantity, to be sure—in contact with the dentinal fibrils for a longer period and thus increase the effect, which could not be true if the medicament were allowed to be washed away by the saliva immediately after treatment. Even assuming that this prolonged desensitizing effect does not occur, the protective coating tends to reduce the sensitiveness *per se*. In pharmacology, a protective is an agent, somewhat related to demulcents and emollients, which mechanically covers and protects sensitive, injured or otherwise defective body surfaces from extraneous influences. For example, the application of a varnish alone, without medication, would probably reduce hypersensitiveness, but the effect obtained would be partial and transient. Coating the previously medicated area with a varnish will protect the area from irritation, especially when the tooth comes in contact again with the saliva. It will prevent the shock to which hypersensitive teeth are occasionally subject as soon as the mouth is closed. This shock is not only disagreeable, but also has a bad psychologic influence because the patient expects immediate relief after the treatment, not additional insult. This undesirable effect can be prevented by applying a varnish having the following composition: gum mastic, 1 part; gum sandarac, 4 parts; alcohol, 16 parts; or a gum copal resin varnish such as ivoline may be used. In recalcitrant cases, and especially where there is much gingival recession, a cement pack such as is used after surgical treatment of pyorrhea may be applied instead of a varnish. This should be left in position for at least two or three days before being removed. A satisfactory formula for such a pack is as follows:

Liquid:	Eugenol	fl. ʒ iv
	Liq. petrolati	fl. ʒ v
Powder:	Zinc oxid	
	Pulv. resin	$\overline{aa}$ ʒ v

The powder should be finely bolted and the liquid should be shaken thoroughly before use. The cement should be mixed to a thick putty-like consistency and packed upon and between the necks of the teeth.

EFFECTIVENESS OF TREATMENT

With the application of the protective varnish, the treatment is complete. The question then arises: For how long will the treatment be effective? or, How often must the treatment be repeated? To date, I have accumulated the records of 108 cases, spread over a period of seven years. It has been difficult to evaluate these data, because of the relatively small number of cases treated by each of

the three methods mentioned, because this small number must further be arranged into different time categories and because a large number of the cases are still under observation. For convenience, these cases may be divided into three arbitrary categories: the number of cases re-treated in less than one year; the number of cases not requiring re-treatment for more than five years, and the average length of time elapsing in the majority of cases before re-treatment was necessary. Of sixty-four cases treated with ammoniated silver nitrate, nine were re-treated in less than a year; 11 have not required re-treatment for more than five years, and the majority required re-treatment in from one and one-half to two and one-half years. Of twenty-four cases treated with formalin, three were re-treated in less than a year; three have not required treatment for more than five years, and the majority required re-treatment in from one to one and one-half years. Of twenty cases treated with sodium-potassium carbonate, seven were re-treated in less than a year; two have not required re-treatment for more than five years, and the majority required treatment in a little more than a year. These data suggest that silver nitrate medication is more effective than either formalin or sodium-potassium carbonate; which coincides with empiric clinical observation.

While proper medication for the treatment of hypersensitive dentin has been discussed here in some detail, the chief purpose of this paper has been to formulate a more effective method of treatment. This consists of three important parts: (1) proper preparation of the hypersensitive area; (2) medication, and (3) protection of the treated area. Each step is an important link of a chain. To omit any particular in the technic is to lessen the chances for success.

PERIODONTIA TREATMENT FOR MAXIMUM REATTACHMENT*

By HAROLD J. LEONARD, D.D.S., B.A., New York City

THE principles of treatment of the various forms of periodontoclasia are simple. They consist of the elimination of irritants (bacteria, salivary and food débris, rough surfaces and other sources of trauma), the maintenance of rigid cleanliness and the reestablishment of tone in the periodontal tissues. Once these principles are grasped, the various current treatments can be considered from the standpoint of their theoretic and practical effectiveness.

Before the surgical principles involved in treatment can be understood, it is essential to have the pathology of the disease with which we are dealing clearly before us. In its simplest form, it is a chronic inflammation at the base of the gingival sulcus which causes a proliferation of the epithelium lining the sulcus. The epithelial cells, even though they proliferate downward at the expense of the periodontal fibers of the underlying connective tissue, are degenerated because

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of the irritants and congestion, and hence are loosely held together and easily torn apart to lead to deepening of the sulcus. These cells, being loosely held together, lymph and pus exude into the gingival space and, from this exudate, serumal calculus is deposited on the subgingival root surface. The connective tissues of the pericementum and alveolar process involved in the infected inflammatory area break down in an advancing zone. The break down of pericemental fibers allows the gingiva to hang away from the tooth, which tends to split the soft tissues farther away from the root. The alveolar process is absorbed by rarefying osteitis as the inflammatory zone approaches it.

The condition presented for treatment is therefore that of a tooth somewhat loosened because of softening and swelling of the pericemental tissue, with pockets representing areas in which the pericemental fibers and gingival epithelium have become separated from the cementum. The denuded cementum surface is full of organic putrefying fiber ends and, in most cases, is encrusted with serumal calculus. The surrounding soft tissues and bone are inflamed, considerably congested and deeply infected with *Streptococcus viridans,* while, in the putrefying exudate in the pocket, Vincent's organisms may abound. Epithelium still lines the gingival side of the pocket, but it is of poor quality, and loose, with gaps where the connective tissue may be exposed. At the base of the pocket, a bulging space is nearly always present, filled with exudate and serumal calculus.

One way to treat such a condition is to cut away all the tissue overlying the pocket, cover the wound thus left with an antiseptic cement and allow the remaining tissues, thus freed of surface irritants and the majority of invading micro-organisms, to heal. This method is quick, easy to apply and fairly positive in results, provided pocket formation has not extended very far toward the apex. Its disadvantages are that it permanently uncovers a great deal of root surface and involves the removal of some attaching and supporting periodontal tissue that could be saved, not to speak of preventing reattachment of investing tissues, which is possible by another method of procedure.

This other method of procedure is the careful curettage of the root surface to free it of all subgingival calculus and roughness and to shave away the very thin outer layer of cementum containing putrescent organic fiber ends. The crown surfaces are treated until they are smooth and polished and the occlusion is adjusted to eliminate occlusal trauma or food impaction. This is followed by the home care of the patient, designed to keep the necks of the teeth scrupulously clean and to massage the gingiva. At weekly intervals, the pockets remaining open are again entered to remove any accumulating débris and to cause a hemorrhage to fill the pocket. In the course of a few weeks, by this method, the pockets close up, partly by a very tight binding of the gingiva about the neck of the tooth and by a slight recession of the gingival margin, but partly, I am convinced, by a gradual reattachment of the pericementum to the denuded and curetted cementum. By this method, not only is a maximum of covering tissue of the roots retained, but also no supporting tissue is destroyed in the operation, and some is restored.

THEORY OF MASSAGE

Probably no single therapeutic procedure in the practice of periodontia has done so much for success in treatment as the use of massage. Massage is a succession of pressures and releases to stimu-

late an active flow of blood in a tissue. In the case of the gingival tissues, it is designed to squeeze out stagnant blood and lymph and to disperse the bacteria contained deep in the tissue so that they may be destroyed in the active blood stream. New blood is brought into the congested tissues so that healthy granulation tissue may fill the space at the base of the pocket. With massage so executed that the pressure reaches the deepest points of inflammation and congestion, a healing reaction takes the place of a progressive inflammatory and degenerative one.

To be effective, the pressure of massage must reach to the depths of inflamed tissue. A sweep with a brush from the mucobuccal fold to the gingival margin will hardly accomplish this. In fact, no brushing technic may be sufficient at first, and various methods may have to be employed until the tissues are healed. The Charters technic of brushing and massage is perhaps the most effective general method so far devised. This consists in applying the bristles of a very hard toothbrush to the necks of the teeth so that the bristles point slightly toward the occlusal surfaces of the teeth and the sides of the bristles only rest against the gingival margins. With a slow and very short vibratory motion, the bristle ends work on the tooth surfaces to break up adherent débris, while the sides of the bristles press and then release the gingival margin, the pressure being directed so as to reach the depths of the inflammatory areas toward the root ends. The pressure stroke against the gingival margin should be sufficient to blanch the tissue. The release should be long enough to permit the blood to flow back into the tissue. This takes about one second. Thus, one stroke per second, theoretically at least, would seem preferable to a rapid vibratory stroke.

The Charters brushing technic gives adequate gingival massage in cases wherein the inflammatory zone is shallow, but where the zone extends far toward the apex, it is not sufficient, since pressure from the margin will not be transmitted so deeply. In advanced cases, therefore, a finger massage is necessary for a time until healing has occurred. Finger massage is given by squeezing the gingival tissues between the thumb on the lingual or palatal side and the forefinger on the labial or buccal. The places needing massage can be identified by the patient as the points which are sensitive to deep pressure.

Dental floss is a necessary adjunct in massage. The floss is inserted in each interproximal area and bent around first one proximal tooth surface, then the other, in the manner customary to dentists. But instead of cleansing the tooth surface by sawing back and forth, the floss is forced up and down between the contact point and the base of the gingival sulcus in such a manner as to cleanse the tooth surface and, at the same time, give a series of pressures and releases to the tissue at the base of the sulcus. Thus, the proximal surfaces of the teeth are cleansed and the interproximal gingiva is massaged in a manner impossible with a toothbrush, especially when the papillae are receded.

Massage is a series of pressures and releases, not friction by scrubbing the gingiva. Any technic which tends to scrub away the superficial epithelial cells of the gingiva almost invariably causes recession. The gingiva does not respond to friction as does the skin on the palm of the hand. Friction on the gingiva, instead of causing the development of a thick layer of keratinized epithelium on the surface, seems to cause a downward growth of epithelium at the expense of the subepithelial connective tissue, and

thus leads to recession. Whether or not this is the exact mechanism, it is a fact that scrubbing of the gingival epithelium with any abrasive causes rapid recession, especially if the gingiva is thin.

MAY REATTACHMENT OCCUR?

The subject of reattachment of pericementum in treated periodontoclasia has been a disputed one for many years. It is a scientific point on which it is unusually difficult to get laboratory data. Patients who have had teeth successfully treated are usually unwilling to have the teeth removed with a block of surrounding tissue in order to have histologic examination to prove that healthy pericementum now exists where once the cementum was bare. Laboratory animals are unsuitable subjects for experiments of this kind. The teeth of monkeys and smaller laboratory animals are too small for accurate periodontal treatment and those of dogs differ too much in shape and function for comparison with the teeth of human beings. It is only rarely therefore that histologic evidence of reattachment can be obtained. I know of only two cases in which the evidence is at all conclusive.

One of these is a case of John Oppie McCall's, in which Harold Keith Box, of the University of Toronto, obtained the evidence. The tooth was a lower central incisor with a deep periodontoclasial pocket on the lingual side, which was successfully treated in a demonstration clinic by Dr. McCall. Later, the tooth developed a deep labial pocket and had to be extracted. A block of tissue including the lingual reattached tissue was obtained and sectioned by Box and reported in his booklet "Studies in Periodontal Pathology."[1] This definitely showed reattachment, with new cementum laid down over the area of curetted cementum. Higher up, the epithelium for a considerable distance had attached itself to the cementum surface.

The other case is one shown me privately as a lantern slide by Willard Fleming, of the University of California, and which, as far as I know, he has never published. A prisoner of San Quentin was used for experimental purposes. A lone bicuspid which needed to be extracted for purposes of restoration was treated for a deep pocket on the distal aspect. This was later extracted with a block of surrounding tissue. In the area where the pocket had been, new cementum was present, with definite pericemental principal fibers passing into it.

I was also shown privately a series of roentgenograms by Arthur H. Merritt, in which he had treated a patient for a pocket on the lingual aspect of an upper central incisor. The pocket extended almost to the apex and the lingual alveolar bone could be seen at that point. The series showed the gradual growth of new bone back to the normal level near the lingual cervix of the tooth. Such a growth could hardly have occurred without the growth of a new pericementum, attached to new cementum laid down on the denuded tooth root. After healing, no pocket could be demonstrated clinically on this tooth, according to Dr. Merritt.

I do not see why such a growth of new cementum and pericementum should seem impossible to histologists. It is common experience that the area of tooth root injured during the extraction of an impacted neighboring tooth heals normally provided it does not remain open to the surface. Areas of destroyed cementum in cases of root resorption commonly heal by filling in with new cementum and pericementum.[2] The only difference

1. Bull. No. 7, Canadian Dental Research Foundation, 1924.

2. Kronfeld, Rudolf: Histopathology of the Teeth and Surrounding Structures, Philadelphia: Lea & Febiger, 1933, p. 247.

between such repair and that following periodontal treatment is that, in the latter, an opening exists to the oral cavity at first.

With the method of treatment herein advocated, there is no free opening between the base of the pocket and the oral cavity. If the pocket is kept filled with blood clot, the underlying connective tissues are effectively sealed from irritants from the mouth, and healing can progress as though no opening existed. At the base of the pocket after treatment, there is almost always between the cementum and the pocket wall a considerable space lined with loose epithelium. After treatment, this space is filled with blood, which is soon replaced with healthy granulation tissue similar to that following a surgical wound of the pericementum. It is entirely conceivable that healing similar to that of a surgical wound occurs, with replacement of normal new cementum and pericementum fibers. The only difference is the mass of epithelial cells left in the periodontal tissue at some distance from the root. These cells are probably absorbed just as bits of epithelium forced into connective tissue in wounds are gradually absorbed and disappear.

Whether or not the histologic proof is adequate, every periodontist has had cases in which there was good clinical evidence of reattachment. Successful treatment consists in reducing pocket depth to that of the normal gingival sulcus. It is seldom that this is accomplished entirely by absorption and recession of the overlying gingiva when treatment is given by the method of root curettage and massage. A little reattachment probably occurs in most cases; a remarkable amount in exceptional cases. The problem is to learn the requirements in technic to get considerable reattachment as a rule instead of exceptionally.

Perhaps the answer lies in some method of removing the epithelium lining the pocket in accordance with the ideas of Box and McCall. Box advocates curetting the lining epithelium after healing has started and infection has been reduced. This is done with delicate soft tissue curets inserted in the pocket. McCall uses an epithelial solvent, a solution of sodium sulphide inserted in the pockets, after which the softened epithelium is curetted out. These methods appear sound theoretically, since a growth of new cementum and connective tissue fibers cannot be expected on a cementum surface against which epithelium is lying. Such a result can be expected only when healthy organizing connective tissue is in contact with the curetted cementum surface. The interesting fact is that cases of reattachment occur in practice when no attempt has been made to remove the epithelium lining the pocket.

The reason for this seeming impossibility lies, I believe, in the fact that, deep down in the pocket, the epithelial surface is not in contact with the tooth. Exudates and calculus cause a wide space to exist between the cementum and the epithelium. After curettage, this space is filled with blood clot, which is soon replaced with healthy granulation tissue. Thus, in the deeper portions of the pocket, ideal conditions are present for the regeneration of pericementum. With epithelium and connective tissues both regenerating as infection subsides, there is a race as to which will line the cementum surface. Periodontal technic must intervene to see that the advantage is in favor of the connective tissue.

The accomplishment of this purpose involves regular operative interference subsequent to the original curetting operation. At weekly intervals, remaining pockets should be gently curetted to

remove any possible débris which may have accumulated in the not completely closed space, but more than that to open the space and give room for a new blood clot to lie against the cementum surface. The curetting instrument should of course not be pushed beyond the point where the tissue is definitely detached. By this means, the pocket depth will gradually be lessened by what, I believe, is a reattachment of normal pericementum. Certainly, the results are gratifying. The pockets are obliterated, the tooth becomes firm, the alveolar crest is built up and infection is eliminated, with the minimum amount of gingival recession and with no needless loss of attaching tissue.

THE TREND IN ORTHODONTIA*

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IN a consideration of the trend in orthodontia, the thought that the whole status of orthodontia is undergoing a complete change stands out as a major premise. It is not easy to explain this change.

The older members of our profession well remember when the straightening of irregular teeth was a part of the daily work of any dentist who was sufficiently interested in that type of practice to undertake the work. At that time, orthodontia, or, perhaps better, "regulating teeth," was considered a part of general practice. About 1900, the first school of orthodontia was organized, by Angle, and, with the creation of this school, there developed the idea that orthodontia should be taught and practiced only as a specialty of dentistry and not as a part of general practice.

Of late, there has been quite a definite difference of opinion as to which of the two foregoing practices should prevail. It seems clear that neither in itself is inclusive enough for the service which modern orthodontia must give.

Modern orthodontia, whether viewed from the standpoint of theory or of practice, presents many difficult and unsolved problems, which may account for its rather limited development so far as its number of practitioners is concerned. In view of the problems involved, it is easy to see why there are differences of opinion as to the amount of training and experience necessary for its practice. The entire proposition must be viewed from two angles: the demand for the service and the source of supply. The patient is interested in securing competent service at a fee within his economic bracket and the dentist is interested in the problem or advisability of including this work in his practice. The sincere dentist is also interested in acquiring the theoretical, technical and clinical ability to render the proper service.

The present educational "set-up" limits the general practitioner, in the main, to the reading of textbooks and the periodical orthodontic literature, witnessing clinics and demonstrations and, possibly, attending a "short course," which at best

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can be of but little more real value than a stimulus. On the whole, such a set-up is wrong—the start is made at the wrong end of the dentist's program of practice.

Orthodontia owes much of its development to the early practitioners and their application of mechanical principles, but the art or science has had a remarkable development in recent years because of the interest and enthusiasm of those who believed it should be studied and practiced as a specialty. On the other hand, it may be said that the pioneers in the work were skilled artisans who based their studies solely on the "machine" necessary to accomplish the result. On the other hand, the modern worker has given a great deal of thought to the problem of growth, development, function, etc., in addition to the mechanical principles. In short, the orthodontist of today looks on the subject as a problem of biomechanics. There are a few men who have gone so far as virtually to discard appliances on the theory that if growth, development and functional activities are under proper control, appliance therapy is unnecessary. It should be perfectly apparent that until such time as prevention supersedes the necessity for cure, these several lines of thought must be considered conjointly.

An early definition of orthodontia stated that its object was the correction of irregularities of the teeth. This definition, in the light of the advances that have been made, is wholly insufficient. One has but to glance through the modern textbooks to observe that contemporary writers are unanimous in the belief that the early definition is inadequate in present-day practice. Today, we define orthodontia as that branch of dentistry which has for its object the prevention and correction of oral and facial anomalies, and for the harmonizing of the structures involved so that the resulting dental mechanism will harmonize with the human organism as a whole. It is a study of growth and development which aims at the realization of the proper anatomic and functional relationships of the associated parts. It deals with biologic problems which are solved only in part by the use of mechanical appliances.

Let us pause for a moment to analyze the definition: whereas, the early definition limited the work to the correction of irregularities, the modern concept prevents as well as corrects. This at once reminds us that we must go into an exhaustive study of the causes of irregularities in order to prevent them. It is as useless to attempt a cure of malocclusion without knowing the cause as to attempt to cure acute appendicitis with castor oil. Further, we notice in the definition the words "oral and facial anomalies," a phrase which is vastly more inclusive than "irregular teeth."

The prevention and treatment of abnormal conditions which are now considered as being within the field of orthodontics may be grouped somewhat in accordance with their severity, under five headings: 1. Malposition of individual teeth. 2. Maldevelopment of arch form. 3. Malrelation of dental arches. 4. Malrelation of dental arches and maldevelopment of either or both maxillary and mandibular bones. 5. Miscellaneous deformities including such conditions as maxillary cleft, deformities due to prenatal influences, disease, fractures, burns, blows, etc., and abnormalities of form, number and eruption of teeth. Some of these conditions may be treated entirely or in part by surgical methods, or they may be treated by prosthetic measures, or by orthodontic methods or by a combination of the several methods.

Any rearrangement of the teeth must be accomplished in such manner that their occlusal relations are in harmony

with the excursions of the heads of the condyles in the glenoid fossae during the lateral and protrusive movements of the mandible, masticatory efficiency thus being increased. We find also in the definition a reference to the influence of orthodontic treatment on general health conditions, facial balance, personality, the correction of speech defects, etc.

It is well recognized that the human body is subject to periods of growth activity and rest. The dental apparatus is no exception to this and therefore the biologic phase of these parts must be understood. Many of the tissue changes are accomplished through mechanical stimulation, with its influence on growth and development. Thus, we see that modern orthodontia encompasses vastly more than the mere moving of teeth, and accordingly our newer concept of orthodontia must include all factors which will result in the dental mechanism's harmonizing with the human organism as a whole.

It is perfectly obvious that the work of the orthodontist embraces far more than the correction of irregularities of the teeth. The word orthodontia, which literally means "straight tooth," was adopted when the mechanical conception and the mere straightening of teeth were the prevailing thoughts. In the light of present orthodontic accomplishment, the term does not seem to be sufficiently comprehensive and many writers have been casting about for a more descriptive term.

Orthodontia may be regarded as a branch of orthopedic surgery; and because of the intimate relationship existing between dentistry, medicine and surgery, some term that would definitely tie these three sciences together has been desired. The terms "dental orthopedics" and "oral orthopedics" have had and still do have a number of supporters, although I prefer "dentofacial orthopedics" if any change is to be made. The American Association of Dental Schools has adopted "oral orthopedics," and presumably this will be used in their curriculums in the future. Regardless of all discussion regarding the name of the subject, it will probably be known as "orthodontia" or "orthodontics" for a long time to come. Common usage gives an understandable meaning to many words in our vocabulary.

Because of its orthopedic nature and the belief that it is a highly specialized branch of the healing art, it has been suggested that orthodontia be taught and practiced as a separate and distinct specialty. Orthodontia may be regarded as a branch of surgery, but it must also be regarded as an essential branch of dentistry. The evils of malocclusion are associated with many dental troubles, and the dentist is faced with them in many instances. Orthodontic service is just as definitely linked with a full knowledge of dentistry as skilful dental service is based upon the fundamental principles of orthodontia. In the field of oral health service, the dentist is an authority because of the nature of his professional training and service. To separate orthodontia from dentistry would be a calamity for both dentistry and orthodontia.

In a study recently made by the American Dental Association,[1] it was found that 32.3 per cent of 4,934 dentists in general practice include orthodontia in their practice. The percentage of orthodontia done by these men varies greatly in the several states included within the report, probably owing to local conditions and influences. For instance, in Wisconsin where the dentists have displayed an unusual interest in orthodontia for a

1. Fahs-Beck, Dorothy, and Leven, Maurice: The Practice of Dentistry and Incomes of Dentists in Twenty States, University of Chicago Press, 1929, pp. 16-18.

number of years, 63 per cent of the general practitioners report that they practice orthodontia. In Arizona, where attempts to control orthodontic practice by legislation have been made, but 14 per cent of the general dentists undertake orthodontic treatment.

At the recent meeting of the American Association of Dental Schools held in Chicago in March, 1934, some very interesting points relating to the teaching and practice of orthodontia were presented and discussed. A most comprehensive report[2] dealing with the teaching of the subject was adopted by the association. (This survey was made under the direction of the American Association of Dental Schools with Dr. Blauch as executive secretary and was sponsored by the Carnegie Foundation. The report is now in process of publication and will be ready for distribution in the near future.) This action cannot help having a profound influence on the future of orthodontia. I shall touch on a few of the high spots of that report. This report might be called "Exhibit A" of the present orthodontic trend, and, incidentally, it should be read in its entirety by everyone interested in orthodontia. The report indicates a very definite trend toward more active participation in orthodontia by the general practitioner.

It was my privilege to be chairman of the orthodontia subcommittee which worked on the survey of the dental curriculum compiled by Dr. Blauch. My study of the vast amount of material assembled convinces me anew that inevitably orthodontia will have a larger place in general practice. How to gage the amount of dental training necessary to meet the problem adequately, yet not detract from the specialist's field, is perhaps the question of the day. That the present undergraduate instruction is wholly inadequate is well recognized, as is the obvious sketchiness of the short postgraduate courses of instruction. On the contrary, the comprehensive graduate courses, from their very nature, are decidedly limiting as to the numbers who may take up the work.

For instance, at Northwestern University, the graduate course in orthodontia requires the student's undivided attention for one full collegiate year. There is offered an option in this connection which permits the student to devote one-half of his daily time to study. If the student elects the half-time plan, he is required to take up residence at the university for twenty-one months. The former plan is designed for practitioners who reside at points distant from Chicago, while the latter plan is designed for practitioners who live in, or sufficiently near, Chicago to spend but half of each day at the university.

There are a great many men practicing orthodontia as a specialty who are self-trained or have taken the short courses that have been given by postgraduate schools during the past decade or two. These methods of preparation have satisfactorily filled a need during the developmental era in orthodontia. If the action taken by the American Society of Orthodontists at Oklahoma City in 1933, wherein disfavor of a continuance of the short courses of instruction was recorded, is a criterion, the "short courses" will pass from the scene. In addition to this limitation, the licensing boards, in an increasing number, are seriously considering a special type of examination and licensure for those who wish to announce themselves as specialists. The American Society of Orthodontists sponsors the American Board of Orthodontia. This board has for its duty the examination and certification as to fitness for speciali-

2. Blauch, L. E.: Survey of Dental Curriculum.

zation of such applicants who may thus desire to inform the public of their qualifications.

Judging from the number of inquiries that are received by Northwestern University, there is an urgent demand for short courses under university auspices. While we now have nothing of this sort to offer the general practitioner, there has been some consideration as to the advisability of offering short courses to practitioners who are able to convince the committee on admissions that they are particularly interested in orthodontia and that they are doing a considerable amount of this work in their general practice. The offering of such a course is still problematic.

According to the director of the United States census, one third of our population, or 41,000,000 inhabitants, are under 16 years of age. Fully 75 per cent of these children require general dental care and not less than 50 per cent, or more than 20,000,000 children, have oral anomalies which should receive orthodontic treatment. This figure is appalling because, from the best statistics available, considerably less than 1 per cent of them are receiving orthodontic service. The surface is barely being scratched. This is due probably to two conditions: (1) that an insufficient number of dentists are rendering this type of service, and (2) economic conditions.

It has been estimated that one-half the families of the United States have an annual income of less than $1,800. These families cannot possibly afford to pay the fee charged by the orthodontic specialist. There is no doubt that the problem of caring for the masses must be solved by the dental profession, else we may later be embarrassed by having a solution forced on us in the form of government-controlled clinics or clinics controlled by private foundations; in which event, the dentist will become a salaried worker instead of the director of the enterprise. I am definitely of the belief that regardless of the number of general practitioners who may eventually undertake the correction of malocclusion, there will still be an abundance of work for the specialist. He will be given the prestige of handling severe cases, while the family dentist will be intercepting malocclusion.

It is interesting to note the geographic distribution of orthodontists in the United States and to relate their distribution to the distribution of great numbers of people in need of orthodontic service. In the 1934 edition of the Orthodontic Directory of the World, there are listed 902 orthodontists in the United States. These are divided by states in part as follows:

New York	142
California	110
Illinois	58
Michigan	45
Ohio	45
Pennsylvania	45
Massachusetts	42
Texas	40
Minnesota	16
Wisconsin	11

Seven states have but one orthodontist each. Obviously, some of the latter states are rather sparsely populated, but the fact remains that, with the present method of practice, many thousands of people are denied the privilege of orthodontic service. Apparently, it remains for the family dentist to supply the needed service.

The orthodontists in the United States reside principally in the larger cities, and these cities include but 36 per cent of our population. Of course, a portion of our population residing near these larger cities may take advantage of the opportunities afforded, but this is always attended by considerable inconvenience and expense.

A questionnaire was recently sent to 985 dentists, graduates of various dental schools, who were regarded by their schools as progressive and successful alumni in the general practice of dentistry. Five hundred and nineteen replies were received from these men, residing in all parts of the United States. The tabulated replies may therefore be regarded as a fair cross-section of the type of practice of the better members of our profession. Of these dentists, 44 per cent include some orthodontia in their practice, the amount of orthodontic practice with this group averaging about 35 per cent. A large number of dentists reported that they advise patients regarding conditions; some refer the work to orthodontists, and a considerable number of them try to arrest or prevent the development of malocclusion. On the basis of the evidence received, the conclusion is warranted that perhaps 50 per cent of the progressive dentists in general practice attempt in various ways to prevent the development of malocclusion. These and other figures from the same questionnaire must be accepted as reasonably conclusive evidence that orthodontia has some place in the general practice of dentistry.

The future is bound to provide a better distribution of orthodontic service because of the increasing number of men undertaking graduate study; but, again, most of these men are preparing for specialization and will choose city locations. There are perhaps a dozen universities now offering courses for the preparation of specialists in this field, so that, within a few years, a large number of men well qualified for practice will enter the field. Still, according to statistics, the number will be inadequate.

A further study of the questionnaire included in Dr. Blauch's report reveals additional points of interest. For instance, but twelve in one group of 223 general practitioners who treat cases of malocclusion have had special training in orthodontia. A few in this same group report having taken courses in a study club. Obviously, the majority of this entire group is undertaking correction of malocclusion with no special training beyond a meager undergraduate curriculum, the reading of orthodontic literature and the attending of clinics and demonstrations. Clearly, this is not in accord with the standards and ideals of modern orthodontia.

Again, it is a matter of record in the report that an overwhelming number of dentists believe training in orthodontics should constitute an important feature in undergraduate study. It is interesting to note that the University of California, several years ago, undertook a modification in the undergraduate dental curriculum wherein the student so electing may substitute orthodontia for certain parts of other courses in clinical dentistry.

The dental schools are definitely confronted with the problem of formulating a course in which the student will acquire theoretical knowledge and technical and clinical ability in at least three channels: (1) an appreciation of the science of orthodontics, (2) the training to recognize and diagnose malocclusion and (3) the ability to prevent or to intercept malocclusion. Equally important is the correlated knowledge which the student will gain in other branches of practice by a more thorough knowledge of orthodontic principles. It also becomes the obligation of the schools to impress the student with the dangers attending orthodontic treatment by the incompetent practitioner.

That you may have some appreciation of the aims of Dr. Blauch's subcommittee on orthodontics, I include the following:

The objective of instruction planned in the report is to furnish a rather thorough grounding in the fundamental principles of

orthodontics and the application of those principles in practice so far as they are related to the work of a general practitioner of dentistry. This objective implies that the student shall sufficiently master the theory and practice so that he may be able to cope with the problems usually associated with simple cases of malocclusion of teeth encountered in the general practice of dentistry, "simple cases" usually being those that involve only the correction of arch form, and those whose diagnosis and treatment can be carried out without undue difficulty. It recognizes the impracticability of expecting the undergraduate student to deal with all the intricate problems incident to difficult or unusual cases.

The instruction should aim at giving the student an appreciation of the important place of orthodontics in modern dentistry, and creating in him a desire to study the subject in his undergraduate course, in his years of practice, and in post-graduate or graduate education. . . .

The content of the undergraduate course is based upon health needs as far as they can be ascertained. It is intended to emphasize a thorough understanding of the biological factors involved, as well as a knowledge of the principles of mechanics and the materials that should be organized in methods of treatment designed to promote health service and efficiency in orthodontics. . . .

Before the student begins the study of orthodontics, he has presumably obtained substantial familiarity with the morphology, the histology, the arrangement, functions and development of the teeth, and the gross and microscopic anatomy of the mouth and associate parts. . . . The instruction as outlined contemplates a review of parts of these subjects, with special application to the procedures in planning, constructing, and using orthodontic appliances. Training in the more difficult types of orthodontic treatment is left for post-graduate and graduate study.

In all this instruction there should be constant reference to other branches of dentistry. Orthodontics should not be regarded as an isolated part of the student's training; it employs some principles taught in other courses and the principles of orthodontics should be taught in such a way that they carry over into the other subjects. To regard any subject in the dental curriculum as an isolated subject is to fail to use it properly in the training of the general practitioner of dentistry.

The proposed curriculum in orthodontia will include about 400 hours of preclinical and clinical instruction. Of these, about 150 hours will be devoted to didactic and laboratory instruction and about 250 to clinical instruction.

Finally, the proposed orthodontic curriculum of the future will correlate the fundamental and biologic sciences of dentistry in a manner not heretofore attempted. Orthodontia, as no other subject, will bind together all theoretical and clinical branches of dentistry the common aim of which is the normal of form and function, which, in the last analysis, must be the basis of diagnosis and of all dentistry.

PRACTICAL PARTIAL DENTURES OF THE REMOVABLE TYPE*

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PARTIAL dentures of the removable type should be expected to (1) enhance the masticatory efficiency of the remaining natural teeth, (2) prolong the period of usefulness of the remaining natural teeth, (3) assist in the maintenance of a state of normal health of the oral cavity, provided systemic conditions do not become a destructive influence and (4) become a part of the masticatory apparatus without enunciatory interference, and without undue discomfort or annoyance to the patient. They should be so designed that they will not retain an excessive amount of food and they can be easily cleaned by the patient. Their design should be simple to permit easy insertion by the patient. The plan for retention should not be elaborate, and only the amount of retention that is necessary to overcome the forces which tend to displace the partial denture should be included in the design. The denture should be of sufficient strength to withstand a limited degree of abuse, and should satisfy the esthetic requirements of the case.

Partial dentures should not be regarded as temporary appliances that (1) hasten the loss of the remaining natural teeth, (2) exert a destructive influence on the bone or the soft tissues, (3) cause caries and erosion of the teeth or (4) serve as a last resort before the construction of full dentures.

Although the members of the profession enter into scientific discussions relative to the restorative service which they believe to be ideal, there has never been a period during the history of the profession when the masses of the people have been able to afford the ideal types of restorative service.

The unit-cast partial denture is more simple to construct than some of the more complex types of partial dentures, and its utility is of such character as to permit the use of the unit-cast partial denture in the majority of the cases wherein treatment by the use of partial dentures is indicated. The service which is rendered by the unit-cast partial denture compares favorably with the service that is rendered by amalgam and inlay fillings, crowns, fixed bridges, full dentures, etc., which are commonly used in the practice of dentistry. Therefore, this discussion shall be confined to the unit-cast partial denture.

Because of the influence that systemic disease has on the condition of the oral cavity, examination includes a consideration of the general health of the patient. If any general or oral pathologic condition is in evidence, a diagnosis is made, and the proper preliminary treatment is prescribed. Further examinations are used to determine the biomechanical treatment which may be necessary, and the design of the partial denture. For

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this determination, study casts, which are properly constructed and attached to the articulator or relating instrument, a complete roentgen-ray survey and an oral examination are necessary.

All preliminary procedures indicated by these studies are completed before proceeding with the construction of the partial denture. If any of the remaining teeth are "poor risks," or if they interfere with the correction of the occlusal relation, they should be removed. To provide more space, the ridges may need surgical correction, that the artificial teeth may be properly arranged for functional balance, and may harmonize with the alinement and appearance of the remaining natural teeth. The occlusion of the natural teeth should be studied in the mouth and on the articulator. If occlusal interference is noted or if any of the teeth are not in occlusion, the necessary corrections should be made in order that the functional balance of the partial denture may be made to harmonize with the remaining natural teeth. Individual prostheses, such as fillings or crowns, may be required. They should be so planned that if they are to be used as rests or indirect retainers or are to be employed to retain the partial denture, they will have the necessary occlusal thickness and the proper axial contour to serve their purpose.

Hurried and incomplete diagnoses can be the cause of many of the failures in the construction of partial dentures. If proper consideration is given to each step involved in the production of a partial denture, many failures can be prevented and the reconstruction of such cases thus be avoided.

Partial dentures increase the susceptibility of the oral cavity to caries of the teeth and to disease of the soft tissues. Therefore, a careful diagnosis and correct designing of the partial denture will minimize the possibility of the occurrence of these conditions. This information should be conveyed to the patient to inform him that, if he does not give his teeth the proper care, the presence of the partial denture will hasten the loss of the remaining teeth.

Many teeth are being removed to make way for full dentures, when, in many cases, these teeth could be utilized for partial dentures, which would give a more satisfactory service than full dentures.

PROCEDURES OF CONSTRUCTION

The Preparation of the Teeth.—The natural teeth to be used for rests or lugs, indirect retainers, etc., will require a certain amount of preparation, which should not be more extensive than is absolutely necessary. The contact points of the teeth should not be destroyed nor should the dentin be exposed. If it is necessary to do so, the teeth should be filled with inlays that are constructed of hard gold alloys. The teeth should be so prepared that the stress will be directed at right angles to the long axis of the teeth. The preparation of the occlusal surface of the molars and bicuspids for occlusal rests should be of a depth to allow for a sufficient bulk of metal to prevent breakage. The breakage will usually occur at the point where the occlusal rest is attached to the axial arm. If the margin of the prepared groove is slightly rounded, this breakage can be prevented. A well-rounded groove which blends with the occlusal contour of the buccal and lingual cusps is much better than a definitely recessed groove.

The Impression.—Because of faulty impressions, many partial dentures are inaccurately constructed. Therefore, carefully taken impressions are essential.

Impression compound is a satisfactory material for the sectional method of ob-

taining an impression. The impression compound should soften at a comparatively high temperature, and the sections should be made bulky to take care of warpage. The section should be made to fit under pressure at a low temperature, and should be quickly removed in order to overcome in part the contraction that is common to all impression compounds. Impression compound should be used for cases in which metal saddles are to be used. The sectional impression method should be used, or the compression of the tissues can be obtained with impression compound, and the impression completed by the use of one of the hydrocolloidal materials or plaster of Paris.

Plaster of Paris or similar materials may be used for the mass-impression technic or for the sectional method. A definite water-powder ratio should be used to insure the proper control of the expansion of the impression mix. Plaster of Paris can be used also for the impression of the ridge spaces, as advocated by some dentists, who complete the skeleton on a cast obtained from a hydrocolloidal impression, then, with the skeleton in place in the mouth, take a mass impression of the teeth and skeleton with plaster or similar materials.

Employment of the newer hydrocolloidal materials, such as dentocoll, is simpler than that of the impression compounds or plaster of Paris. They also have a lesser amount of dimensional change than the other materials. They are satisfactory for all cases in which a metal skeleton is to be used; but they are not satisfactory for the impression of the ridge, unless they are used in conjunction with impression compound. When the hydrocolloidal materials are used, (1) the water-mass ratio must be correct in order that the material will be of the proper consistency to obtain the impression at a temperature that can be borne by the patient, (2) a consistency standard should be determined to avoid periodic failures and (3) the materials should be thoroughly chilled before the impression is removed from the mouth. From a dentocoll impression, the skeleton of the partial denture may be constructed, and plaster of Paris may be used for the impression of the ridge, as previously mentioned, or a baseplate may be attached to the skeleton and the artificial teeth arranged in wax, and the impression of the ridges may be taken with impression compound, wax or other suitable materials, by using the baseplate as a tray. This method is employed for cases that are to be constructed with saddles of vulcanite or of similar materials. The impression and the cast are checked by the use of check-guides that are made in the mouth. The accuracy with which they fit the completed cast will determine to a degree the accuracy of the impression and the cast.

The Cast.—The cast for assemblage or the master model should be constructed of one of the artificial stones or of similar materials.

The usual precautions, such as proper water-powder ratio, mechanical spatulation and vibration, should be followed so that a hard, dense cast can be obtained, and undesirable physical changes be avoided. Undesirable undercuts can be removed, relief provided on the cast with hard wax, and a negative made, from which a duplicate cast can be constructed of a suitable material for the casting process.

The clasp points, occlusal rests, indirect retainers, etc., should be adjusted in the mouth. If the master model is relieved at these points, the preliminary adjustments of the partial denture may be made on the master model.

Design or Case-Plan.—If it is possible, the teeth which are to be used for

clasps should be healthy. It is undesirable to use for clasps teeth that have rough enamel surfaces, areas of enamel erosion or a pathologic condition of the supporting tissues, or teeth that are malposed. As many of the remaining teeth as possible should be used for the retention of the partial denture. By this procedure, unopposed forces can be avoided, and the retention load can be distributed to more of the remaining teeth than has been the case in the usual procedure. This may be accomplished by multiple-tooth retention, which is retention on the mesial or distal aspect of one tooth, and reciprocation of the retention pressure on a tooth in contact with this tooth, or on a tooth that is in the same segment of the arch.

If contacts are not present between the teeth to be used for multiple-tooth retention, they should be supplied by some type of individual tooth restoration. Clasps which are designed for individual teeth should embrace more than one half of the circumference of the tooth. When active pressure is brought to bear on the teeth, whether they are to be used for multiple tooth retention or for individual tooth retention, the pressure must be equalized by a reciprocal bearing to prevent abnormal tooth movement. If the remaining teeth have long crowns, auxiliary stabilization should be planned to prevent rotation of the partial denture. The occlusal rests act as the rotating point; therefore, the tooth on which the rest is placed should have auxiliary stabilizers planned to contact the tooth near the gingivae to prevent rotation of the partial denture. All types of clasps require the use of rests or stops to prevent displacement of the clasp points, the loss of the occlusal relation and undue resorption of the ridges.

Partial dentures constructed without occlusal rests can be as destructive as the older types of partial dentures which were constructed without clasps. When partial dentures without rests are frequently rebased, undue resorption of the ridges is produced. The clasps should maintain the partial denture in a semirigid or fixed position to prevent lateral movement of the partial denture. The lateral movement of partial dentures causes tissue destruction and bone resorption. Indirect retainers, stabilizing bars and rigid lingual or palatal bars will assist the clasps in preventing undue movement of partial dentures.

If continuous clasps are used, they should be so planned that the forces exerted on the partial denture will be directed parallel to the long axis of the tooth. They should be light and narrow, and if rigidity is desired, they may be connected to the lingual or palatal bars with small connecting bars. The saddles of bilateral partial dentures should be connected by rigid lingual or palatal bars. All connecting bars, such as clasp bars, lingual or palatal bars and bars for indirect retainers which occupy a tissue position should have ample space between the tissue and the bar.

With the methods and materials that are available, there is no limit to the possible modes of retention. Therefore, cases which appear to be difficult may be satisfactorily constructed, if the plan of the case is carefully studied.

The arrangement of artificial teeth in partial dentures for functional balance should be similar to that of the artificial teeth for complete dentures. The size and number of the artificial teeth may be reduced in those cases in which the reduction will not permit the opposing natural teeth to move from their original position. It is not necessary to overemphasize the importance of retention and stabilization, if the artificial teeth are properly arranged.

The saddles should be extended to less changeable areas, and be in intimate contact with the tissues. They should cover a sufficient area to withstand the load to be applied and to assist in the retention of the partial denture.

The buccal surfaces of upper ridges and lingual surfaces of lower ridges should not be used as supports against the forces of mastication which are exerted on the partial denture, because of the character of the tissues in these regions.

The more common causes of failure in partial denture construction are:

1. Inadequate diagnosis of the prevailing condition of the oral cavity.
2. Improper preparation of the natural teeth.
3. Faulty design.
4. "Overplanning."
5. Misapplication of "model-designs."
6. An incorrect impression.
7. Failure to use occlusal rests or stops.
8. Use of clasp bars or rests of too small a gage.
9. Too great a retention load applied to individual teeth.
10. The fact that the clasp bars are in contact with the tissue.
11. The fact that the lingual or palatal bars are placed in contact with the tissue or are too flexible.
12. Failure to use the anterior palatal bar in those cases in which it is indicated.
13. Improper saddle extension.
14. Use of extension saddles of metal without a proper impression or for cases in which they are not indicated.
15. Improper arrangement of the artificial teeth.
16. Error in the procedures of construction.
17. Failure to refit partial dentures that have extension saddles, when the resorption of the ridges causes the loss of occlusal relation of the artificial teeth.
18. Use of unsatisfactory alloys.
19. A careless attitude on the part of the patient toward the proper care of the remaining natural teeth and the partial denture.

THE AMERICAN DENTAL ASSOCIATION'S AFFILIATION WITH THE NATIONAL BUREAU OF STANDARDS

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REASONS FOR THE AFFILIATION

As knowledge and experience accumulate in the practice of any art or science, there naturally grows in the minds of the practitioners a desire for more knowledge of the materials being used. As attempts are made to extend the field of application and to correct and refine the processes of an art or science, an absolute necessity for more intimate knowledge of the physical and chemical characteristics of the materials asserts itself. As experience accumulates, possible inadequacies and limitations of the available materials may appear. Then, a desire and, finally, an insistent demand for possibly a new material or a more

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adequate method of handling an old material so that it will meet the requirements develops. Dentistry has followed these generalizations.

AGENCIES CONTRIBUTING TO SOLUTION OF THE PROBLEM

There is evidence that, for many years, there has been developing within dentistry a desire, which finally has become practically a demand, that more knowledge, scientifically derived and therefore of a dependable nature, be made available to practitioners. In the course of this time, several agencies have come forward in an effort to satisfy the demand. Scientific departments of colleges and universities have contributed considerably, especially as regards the pure science aspects of materials. Here and there in the profession, individual practitioners have labored. Certain dental schools have recognized the demand and are doing their part. For many years, certain manufacturers have been interested in the problem of dental materials. True it is, their interest may be flavored with a desire for financial returns and their activity may be stimulated by the sharpness of competition, but many improvements in present-day dental materials must be credited to the interest of honest and progressive manufacturers. Furthermore, there is abundant evidence that many of these improvements were made not because of the possible financial profit, but because of a sincere interest in the art and science of dentistry. In 1928, the American Dental Association established in the National Bureau of Standards, Washington, D. C., a fellowship for the study of dental materials in all phases. Credit must be given to each of these agencies. The demand for fundamentally sound and scientifically correct knowledge of dental materials has been partially met. In the nature of things, it probably never will be wholly satisfied. Therefore, all these agencies must be encouraged and urged to carry on. They provide a comprehensive working group.

A. D. A. RESEARCH FELLOWSHIP

The dental profession, with the American Dental Association acting as an intermediary, is very fortunate to have been able to establish a fellowship in the National Bureau of Standards. This institution has a world wide reputation for its thorough, dependable, unbiased work. Aside from the fact that any of the physical facilities of the Bureau that may be needed are at the disposal of the Association's fellows, the entire staff of the Bureau are available for consultation and advice. These two factors alone are far beyond the financial grasp of the Association. George K. Burgess, the late director of the Bureau, under whom the fellowship was established, was sincerely interested in this dental affiliation and gave much thought and constructive assistance to the work. The present director, L. J. Briggs, is equally interested and supportive. Helpful relationships have always existed between the Association's workers and other members of the Bureau staff.

Some time ago, in the interest of greater efficiency, there was created in the Bureau a section or department designated as the Dental Materials Research Laboratory. Wilmer Souder, a physicist, is the head of this laboratory. In this organizational division, the American Dental Association employs two research associates, George C. Paffenbarger and W. T. Sweeney. Dr. Paffenbarger is a dental graduate and Mr. Sweeney is a physicist. In addition to these employes of the American Dental Association, the director of the Bureau assigns regular members of the staff to assist in dental research. The specialities of the

ones assigned depend on the requirements of the problem or problems then under consideration. The history of this procedure shows that the Bureau, at all times, not only matches the number of Association workers, but, most of the time, it exceeds that number. Here again, it would be beyond a financial possibility for the Association to attempt such a working plan independently.

In November, 1934, an additional worker, John R. Beall, a graduate in mechanical engineering, was employed by the Association. His work will be almost wholly confined to rechecking materials guaranteed by the manufacturers to conform to current American Dental Association specifications.

SCOPE OF RESEARCH AND SPECIFICATIONS

Since the inception of the dental fellowship, the activities have been (1) pure research, (2) establishment of fundamental data and (3) research to set up standards or specifications for dental materials. The results of these researches are reported at the annual meetings of the Association and are published in THE JOURNAL. During the intervals between meetings, THE JOURNAL is always made available for the publication of new developments of a significant nature. The Research Commission of the American Dental Association, when it assumed the dental research fellowship at the National Bureau of Standards, realized that the individual dentist not only desired definite and unbiased information regarding the restorative materials which were being used in the practice of his profession, but also some assurance that the materials possessed dependable, desirable qualities. The following plan was adopted to assist and protect the dentist in the purchase and utilization of these materials. Tentative specifications or standards for dental materials are gradually being developed in the Bureau of Standards laboratory. To date, the following eight specifications have been developed and officially adopted by the House of Delegates: No. 1, for amalgam alloys; No. 2, for inlay casting investments; No. 3, for impression compounds; No. 4, for inlay waxes; No. 5, for inlay casting golds; No. 6, for dental mercury; No. 7, for wrought gold wire, and No. 8, for a dental cementing medium (zinc phosphate cements) (Effective, July 1, 1935).

CERTIFICATION OF PRODUCTS

A plan has been evolved and put in operation whereby the manufacturer can certify that his product meets the specification of the Association. This plan is clearly described in an article entitled "The Dental Research Fellowship at the National Bureau of Standards."[1]

The following, from the above-mentioned article, is quoted here for emphasis:

> It should be clearly understood by both manufacturers and dentists that neither the National Bureau of Standards, nor the Research Commission (American Dental Association) approve, certify or guarantee dental materials. All such statements are solely the responsibility of the makers of the product. The Commission adopts the standards of specification and asks the manufacturers to guarantee their products to meet them.
>
> Every practitioner of dentistry is urged to read this short article and to cooperate with the Research Commission and the manufacturers by applying this knowledge in his everyday affairs.

LIST OF PRODUCTS CERTIFIED BY THE MANUFACTURER

In November, the secretary of the Research Commission presented a revised list of dental materials, the manufactur-

1. J.A.D.A., 20:1040 (June) 1933.

ers of which have certified to the Research Commission that these materials meet the appropriate specification.[2]

It is urged that these specifications be read and studied. Journal references are included in this listing of materials that the reader may know where to find any particular specification.

DISSEMINATION AND UTILIZATION OF DATA AND INFORMATION

When the Association's fellowship was established in the National Bureau of Standards, there were many suggestions as to how the results of this work should be disseminated and utilized. It was realized that there were three groups primarily interested in the results of this work: the dentists, the manufacturers and the public. Of these groups, the public were to obtain the ultimate benefit by receiving better health service; but the immediate and most intimate problems lay with the dentist and the manufacturer. These problems have many angles. The interdependence of the two groups, dentists and manufacturers, is very clear.

SOME PROBLEMS RELATED TO SPECIFICATIONS

It was suggested that specifications embracing the ideal in every particular should be set up and adopted. On sober thought, the proponents of such a theory soon realized that such a plan was not practical. First, who would draw the specifications? It is very evident that authorities do not agree. Secondly, how was such a plan to be enforced? Even if the ultimate ideal material can be determined, the problem of manufacture appears. The ultimate ideal material is a goal to be sought constantly, but it is of no immediate value to the practitioner until it can be produced. It was not an absolute certainty that even improvements in the materials then being used could be made, but it seemed logical to begin with them. Experience has removed this last uncertainty to some extent at least. Improvements have been accomplished. The desire to attain the ideal material has not been discarded, but, in the meantime, the profession and the public are having the benefits of these improved materials. There will be a constant effort to further improve the materials now in use.

Since the ultimate goal was not set with the advent of specifications and standards, the specifications are purposely considered tentative. As research finds methods to improve material and manufacturing methods are devised to incorporate these improvements, the specification and standards for that material will be advanced. If we look at the problem in another direction, it is soon realized that the dental profession must gain a clearer conception of the exact physical and chemical properties a material must have in order that the material may serve its most useful intended purpose. Thus, the Research Commission soon came to the conclusion that any plan, to be effective, must be educational and evolutionary.

BASIS FOR SPECIFICATIONS

Original specifications were set up, based upon the following:

1. The engineering principles and demands of typical restorations.
2. The suggestions and advice of representative members of the dental profession.
3. Suggestions and information supplied by the manufacturers of dental materials.
4. Tests and surveys of materials in particular fields conducted in the Bureau

2. Messner, C. T.: Revised List of Dental Materials Certified to the Research Commission of the American Dental Association, J.A.D.A., 21:2026 (Nov.) 1934.

laboratories and other scientific laboratories.

Questionnaires and conferences were extensively used to canvass members of the profession and the producers of materials. Although it was early and readily discernible that many of the data obtained from these questionnaires and conferences were based upon hearsay and pure empiricism, and some of them were influenced by commercial advertising and motives, many valuable deductions were drawn from them. These data assisted very materially in forming a program of attack of the problem in hand. Even the empiricism was not without its value. Practitioners were getting what was then considered creditable results by empiric methods, largely. But when the problem was finally scientifically analyzed, it was surprising how much fact was obtained from some of these seemingly empiric uses of materials. As a final result, improvements in the materials and technics were indicated as the most logical immediate step rather than the wholesale condemning of products and methods. From such a ground plan, the bureau work progressed.

COOPERATIVE GROUPS

The aim is to improve the quality of materials used by the dental profession through:

1. The distribution of reliable data which will enable the dental practitioner better to understand the characteristics of the materials with which he works and also to increase his skill in selecting materials for his use.

2. The cooperation of reputable manufacturers who will assist in the setting of standards and who will guarantee that their products will comply with the standards so set.

From time to time, when the Bureau work on a given material had reached the proper stage, small groups of selected practitioners, broadly scattered over the country were organized and carried through a course of experiments and instructions. These have been designated as "cooperative groups." The work of the groups has three phases or objectives: 1. The experiments and tests were purposely made simple and of a type that could be performed in the practitioner's office, but each exercise held a lesson for the performer. 2. The data obtained by the practitioners were reported to the Bureau and there tabulated and studied. Some of the reasons for the plan so far may be of interest. Aside from the "personal equation" of each practitioner, there are many other elements that enter into the actual use of materials, such as climatic conditions, altitude temperatures and humidity. These extraneous factors affect different material in various combination and in varying degrees. In the experimental work done on inlay casting investments, the importance of "room temperature" was clearly brought out. Again, water taken from a cold water tap and investment taken from a container located over a functioning radiator were not productive of constant desirable results. Many more examples might be cited, but these two will suffice to call attention to the care and thoroughness that was attempted in gathering and in trying to disseminate information. 3. The third phase of the work carried on by cooperative groups is based upon the premise that the results obtained in a fully equipped scientific laboratory, working on extremely accurate models and forms, using delicate precision instruments and with all conditions closely controlled, probably could not be constantly duplicated in the average dental offices. It is axiomatic that all sound dental technics must be based on applicable scientific facts and principles, but

these scientific facts and principles must have been applied. So, the third phase of the cooperative effort was the devising and checking of technics and procedures that could be used to obtain constant desirable results in the dental office. An attempt was made to harmonize and adjust the data obtained at the Bureau and the data obtained from the experimentation by cooperators into a workable technic or technics.

One illustration of the results attained by the use of this plan of attack will suffice. At the Memphis meeting of the American Dental Association, in 1931, a group of dentists from widely scattered locations in the country demonstrated that desirable casting could be produced by the use of a variety of materials and technics. "Casting to dimension" could be accomplished by any one of these technics. Every one of these technics was suitable for office use, and most of them could be adopted in the average dental office without any financial outlay for additional equipment.

In passing, it is interesting to recall the confusion that surrounded the casting process a comparatively few years ago. The market was flooded with waxes, casting investments, various appliances and gadgets. The society programs and clinics were full of "this" or "whose" method of casting. Some of the materials and equipment then advocated have survived, but most of those which have survived have been improved. Some new equipment has appeared. Only two new types of investment material have been placed on the market. There is a growing consciousness on the part of the profession that materials and methods for making desirable castings are now available. Improvements in apparatus and materials will occur and, in order to take advantage of these improvements, changes in technics will follow, naturally. This will be real progress, which is desired and being sought by all concerned.

As a natural result, in the operation of this plan, much information has been disseminated to the producers and dentists directly contacted. For several very obvious reasons, it would be impractical to attempt to draw the entire profession into "cooperator groups" or even to attempt to canvass them with questionnaires. In the interest of effective work, the number of participants was therefore limited. Even with the imperative restrictions on numbers, somewhat over 300 dentists have been actively identified with these cooperative endeavors—approximately 1 per cent of the American Dental Association's membership.

But the desire and, in fact, the obligation to further disseminate the information derived by the Bureau activity in all its phases was continually recognized by the Research Commission.

To accomplish this end, two plans are being used. In accord with the first plan, state and local society officers have been circularized and urged to use the men who have had the advantages of the cooperating group membership on society programs for papers, clinics and demonstrations. Also, it has been suggested that the cooperators would make nuclei and leaders for local study clubs. The original course of experiments and study forms a worth while program, but the study can be extended easily. Since these cooperative groups are broadly scattered over the country and therefore are of easy access, a large amount of educational work is being done. It is here urged that those who may now be responsible for society programs continue to draw on this source of talent. The National Bureau of Standards Committee and the Bureau staff will be pleased to assist society officers or study club chairmen with suggestions at any time.

The second plan embraces the publication of the reports emanating from the Bureau in THE JOURNAL. A complete bibliography of such publications can be obtained from the Association's Library or the National Bureau of Standards. The profession is urged to read and study these and future reports.

BUREAU REGULATIONS

The National Bureau of Standards has certain regulations which apply to reports emanating from that institution. The reports on dental materials are subject to these regulations. It is only by strict compliance with these regulations that the Bureau's approval and support is obtained. The content of each report is carefully reviewed and checked by qualified committees both within and outside the Bureau. Every effort is made to release only information that is unbiased and reliable and, therefore, can be supported by the Bureau.

PUBLICATION OF REPORTS

It has been the custom of the Research Commission to omit all trade names and brands from the preliminary report on any given class of materials. There are several supportable reasons for such a procedure. A preliminary report is merely a report of progress. Further study may necessitate changes in emphasis in such a report. Manifestly, it would be unfair to connect with a product, data and statements when a complete study had not been made. Therefore, in preliminary reports, each brand of material is designated by a letter or a number. The manufacturer of a given material is informed of the key letter or number used to identify his product and his product only. The reason for such precaution is evident. The Bureau Staff and Bureau Committee welcome conference with a manufacturer on the material or materials which he produces, if he so desires, and they stand ready to assist him with advice and suggestions consistent with the policy of fairness under which the Commission is attempting to "carry on."

LISTING OF MATERIALS

Under certain rules and regulations, manufacturers are invited to certify that their products meet specifications. Reliable data supporting their claims are required. It is customary for the Research Commission to publish lists of materials that have been certified by the manufacturer.[1] It is evident that these are "white lists." The Commission feels that in reality a "white list" is the only classification that is of constructive value to the practitioner. "Black lists" might satisfy a certain type of curiosity, but when a "white list" is available, the "black list" is of no practical value. Furthermore, with a little thought on the many factors and interests, both professional and commercial, entering into this movement for better materials and the possible passive or probably antagonistic attitudes that might be developed by the use of a "crack down" method in dealing with the relations, problems and publications, it is quickly seen that not only would nothing be gained but also, in reality, the cause would be impeded.

As mentioned previously, a plan was put into operation last November to check the materials which have been certified. The materials to be used in this checking will be procured on the open market through regular channels of the retail trade. As a result of future certification and this checking, the lists of certified materials will be revised from time to time. It is the intent of the Commission to publish revised lists in THE JOURNAL at sufficiently frequent intervals to make the lists valuable to the dentists as "a buyer's guide." It is urged that the pro-

fession watch for these lists and keep them for reference. By their use in buying materials, the profession will reap some of the benefits arising out of the Bureau affiliation.

COOPERATION OF MANUFACTURERS

As has been previously stated, the Research Commission has recognized, from the beginning of this movement for better materials, that the manufacturers and dental trade have a place in the picture. The Research Commission frankly asked the producers of dental materials to give consideration to this movement in all its phases and to cooperate actively. It is a pleasure and a satisfaction to state that the attitude of the manufacturers and dental trade has been considerate, helpful and cooperative. Several manufacturers have employed competent and scientifically trained men to supervise factory production, some have provided and equipped research and testing laboratories in their plants and others have extensively used recognized testing laboratories and consulting services outside their plants, in sincere efforts to meet the requirements of better materials. As a result, the dental profession has the opportunity to select and to buy with assurance today more dependable dental materials of certain types than at any time during the existence of the profession. It seems inevitable that a certain amount of resistance and unpleasant incidents occur in initiating any new movement. A few unpleasant incidents have occurred in establishing this movement for better dental materials. But most of these incidents have been brought to an amicable settlement. In no case has the ultimate goal been altered and the total result has been progress.

The Research Commission bespeaks the continued interest and cooperation of all concerned in the progress toward the attainment of the desired goal.

DENTAL RESEARCH AT THE NATIONAL BUREAU OF STANDARDS*

G. V. BLACK'S WORK CARRIED ON

THIS activity of the Research Commission of the American Dental Association at the National Bureau of Standards is in reality a carrying on of the type of investigation of dental materials which G. V. Black did. Prior to Dr. Black's time, there were some studies of the physical properties of dental materials, but they were usually without system and so often contained gross errors. Many years after Dr. Black's death, the dental profession made little progress along this line of work and, with possibly one or two exceptions, the dental schools were devoid of any well-organized instruction on the physical properties of dental materials. When Dr. Black died, no other man of his caliber arose to carry on his work.

NATIONAL BUREAU OF STANDARDS' INTEREST IN WORK

This was largely the situation up to and including the World War period. It is true that some manufacturing firms had done some investigative work, but by and large this was not published or made accessible to the dental profession.

*Report by the Executive Board of the Research Commission. (Notes compiled by R. H. Volland and Bureau staff.)

For a number of years, the War Department experienced difficulty in purchasing dental materials of merit. Since thorough knowledge of the physical properties of dental materials was not available, the purchasing officer could not specify what was wanted. Trade names, personal testimonials of prominent men in the profession, advertising and cut and try methods where the patient was the laboratory were about the only means available by which materials could be judged or used. Thus, the purchasing officer was practically forced to accept the product of the lowest bidder. Because of this situation, the War Department in 1919 requested that the National Bureau of Standards undertake a study of amalgams and, if feasible, formulate a tentative standard or specification for them whereby they could intelligently purchase amalgams of known merit and performance. The director of the National Bureau of Standards referred the request to Wilmer Souder, chief of the Section on Thermal Expansion. Under his guidance, the work has developed from this governmental investigation of amalgam to one where the organized dental profession through the American Dental Association is cooperating with the Federal Government in a study of the physical and chemical properties of dental materials and in the formulation of standards for them.

WEINSTEIN FELLOWSHIP

After the initial amalgam work of Souder and Peters was published in 1920, the late Louis J. Weinstein realized the importance of such studies. At that time, it seemed that he was the only man who had foresight enough to see the future possibilities of an intensive research of this type. He established a research fellowship at the National Bureau of Standards, which functioned from 1922 to 1928. A report of the work accomplished during this period is given in the Bureau of Standards Research Paper No. 32, which unfortunately is now out of print.

AMERICAN DENTAL ASSOCIATION FELLOWSHIP

The Research Commission of the American Dental Association assumed this fellowship in 1928 and has continued it to date. By authority of Congress, outside organizations and individuals may come into the Bureau and do cooperative research on problems which are of importance to the Federal Government. The research fellowship plan has the following essential points: The Bureau furnishes the laboratory space, the use of its scientific instruments and the consulting advice of its staff. It also directs the work and publishes the results. The cooperator buys the materials to be tested and any special equipment that may be required, and pays the salaries of the research associates. The reports on dental materials are published periodically in THE JOURNAL.

FINANCE

The Federal Government appropriated $5,000 yearly toward this work from 1928 to 1930 and $10,000 in 1931. Because of the drastic economy program, this amount was reduced to $5,000 in 1932-1933. For the fiscal year 1934-1935, $4,200 has been appropriated by the Government. The Research Commission allotted $8,800 last year. This was increased by $1,200 (effective Nov. 1, 1934) and an additional research associate employed.

PERSONNEL

The present personnel engaged in dental research consists of: (1) for the Government, Wilmer Souder, Ph.D., physicist, and Irl C. Schoonover, Ph.D.,

chemist; (2) for the American Dental Association, George C. Paffenbarger, D.D.S., W. T. Sweeney, A.B., physicist, and John R. Beall, B.S., mechanical engineer. In addition to the specific personnel, the entire Bureau staff of several hundred scientists are available in a consulting capacity.

NEED FOR STANDARDS AND KNOWLEDGE

For a comparatively long time, the engineer has had extensive knowledge of the physical properties of the materials which he uses and has also had a great number of specifications or standards by which he could judge and purchase materials having known properties. This work at the Bureau is planned and conducted along such lines, the main objects being to study technics and materials. To date, eight tentative standards have been formulated and are now operating; namely, those for amalgam, inlay casting investments, impression compounds, inlay wax, inlay golds, mercury, wrought wire and cementing medium.

These standards are developed by the following procedure: First, trade brands of the materials to be studied are bought in the open market. Representative practitioners are requested to name what they consider to be the best and the unsatisfactory brands. The physical and chemical properties which are considered of importance in relation to their dental uses are then determined. The data from such a survey, together with a logical appraisal of the needs, are used to formulate a tentative specification. This tentative standard is then submitted to dental schools, Government departments, and manufacturers for their criticisms and suggestions. After this, they are presented to the Research Commission for their consideration and approval, and by the Commission to the House of Delegates of the American Dental Association for their consideration. If adopted, they become the official specifications of the Association. These specifications are subject to revision as new or improved materials are developed and new data become available.

CERTIFICATION PLAN

Following the adoption of the specifications, the Research Commission invites manufacturers of the materials concerned to certify formally that their products will conform to the specified requirements. Lists of these certified products have been published from time to time in THE JOURNAL, the most recent list appearing in November.[1]

This list of certified products will be checked by the A.D.A. Research Associates stationed at the National Bureau of Standards. The A.D.A. will procure retail packages of the materials and test them for compliance with their guarantees. The trade names of the materials investigated will be published. One research associate will devote his entire time to this checking of certified materials. This will permit the other two associates to investigate other materials and to revise the specifications in keeping with the latest developments.

WORK IN PROGRESS

In addition to the present check testing of materials on the list of certified products, the silicate cements and materials used as denture bases, such as vulcanite and the various artificial resins, are being studied. Reports on them will be presented as the work progresses.

MANUFACTURERS' COOPERATION

In the vast majority of cases, the man-

1. Messner, C. T.: Revised List of Dental Materials Certified to the Research Commission of the American Dental Association, J.A.D.A., 21:2026 (Nov.) 1934.

ufacturers are cooperating whole-heartedly with the Research Commission. A perusal of the advertising of dental materials will show that many manufacturers are stating that their products comply with the American Dental Association's specifications. Many manufacturers are also stating the physical properties of their materials on the package or in the accompanying literature. The Research Commission is very desirous that this movement be encouraged. Manufacturers will supply standard materials of known quality if the dentist demands them. The effectiveness of this program of the Research Commission regarding the problem of standards of quality is therefore in large measure in the dentist's own hands. The Commission realizes, of course, that some manufacturers have advertised that their products complied with the Association's specifications when in fact they did not. They have attempted to stop such practices by publishing the results of the testing of these products, by bringing action through the Federal Trade Commission and by dealing directly with the manufacturer. Not all advertising of this type is intentionally fraudulent, much of it being the result of ignorance of the specifications and carelessness. The Research Commission desires to cooperate with the manufacturer in every possible way and will render every assistance that it can to prevent or stop questionable advertising which involves the use of the Association's specifications.

There is a large amount of research work and routine testing being done by manufacturers as a direct result of this Association's activity, for now it is necessary that the maker be familiar with the properties of his products in order to know whether they meet the standard set up by the profession.

PUBLICATION OF REPORTS

Fifty-three reports have emanated from this work. The Reports from item 13 on were made since the American Dental Association assumed the fellowship.

A. D. A. COMMITTEE

The Executive Board of the Research Commission has appointed a special committee of three of its members to direct the Association phases of this work. R. H. Volland, Harry Kelsey and C. T. Messner compose this committee at present.

QUO VADIS DENTISTRY?

By T. E. PURCELL, D.D.S., St. Louis, Mo.

COMPETENT authorities estimate that half our high school graduates and one third of our college graduates are vocationally misplaced. By this is meant that, after graduation, our students in overwhelming numbers go into vocations requiring abilities different from the particular ones they possess. In many cases, of course, time and experience bring about more or less satisfactory adjustment. In other cases, the dissatisfaction and maladjustment is lifelong.

Approximately 337,000 students will enter American colleges this year. Of these, according to figures based on past experience, five out of seven, or 241,000,

will never graduate; 75,000 will not get through the sophomore year; one ninth of all who enter will fail in their freshman year, and about 96,000 will ultimately secure their diplomas.

The great majority of those who fail or give up do so because they are not suited by the trend of their abilities for the work which they undertake in college. Many of them have abilities of no mean order, and some have even exceptional abilities in certain directions. Parents must remember that collegiate standards of scholarship are now such that success in any recognized institution requires to a certain degree a natural aptitude for the subjects in the curriculum. Therefore, the discovery of a vocational trend may be of particular value to the prospective college student. It will help him to decide on the kind of course from which he will derive the most benefit, and the type of institution which he should attend.

One of the most serious problems that confront the dental profession is the alarming decrease of students matriculating in dental schools. Dr. Lasby, the president of the American Association of Dental Schools, in his address before that body last March, brought out the fact that the number of matriculants in dental schools of the United States has decreased from 13,099 in 1922, to 7,160 in 1932. This is the smallest number in attendance at any time over a period of twenty years.

During the same time, there has been a decided increase in the number of students registering in other institutions of collegiate grade. In medicine, there has been an increase of 54 per cent; law, 97 per cent; theology, 81 per cent; pharmacy, 117 per cent, and engineering, 42 per cent.

Bissell B. Palmer, in his presidential address before the American College of Dentists at St. Paul, Aug, 5, 1934, stated:

For more than a decade the matriculation in dental schools has been decreasing annually. In this trend a serious development in relation to the future of the profession must be recognized.

That the later phases of this condition are not due solely to present economic conditions is indicated by the fact that the matriculation in medicine and other professions is still in a pronounced upward trend.

In any consideration of causes of this development attention must be focused on the minor differences existing in entrance and curriculum requirements at the schools for the medical and dental degrees.

Sufficiently high standards of dental education are, of course, essential; but if our requirements are made so high that matriculants can obtain a medical degree with but little or no additional expenditure of money, time and effort, they may find the privilege of practicing the whole of medicine—with its choice of many specialties—instead of the restricted field of dentistry, so attractive, that in a comparatively short period of time the public may be faced with a shortage of dental practitioners. Serious and intensive study of this problem, in the public interest, would seem to transcend in importance any other question now before dental educators.

THE RELATION OF DENTISTRY TO MEDICINE

The College by resolution has already expressed its view that dentistry is autonomous, but should be made a full health service equivalent of a specialty of medical practice. It views the relationship of dentistry to medicine as one of the closest possible intimacy; and in this relationship we urge integration without subordination, and cooperation without humiliation.

Dentistry and medicine are both health-service professions that diagnose, prescribe for, and treat human ailments. One profession has a wider field than the other, but both are motivated by the same spirit of rendering health-service. European experience indicates that whenever dentistry loses its autonomy to medicine, its progress

is impaired and its development hindered. We believe it is to the public interest that dentistry should develop as a separately organized profession.

Surveys national in scope of the health of children in our schools disclose the fact that 95 per cent, or 25,000,000 children between the ages of 6 and 15, have carious teeth. No comprehensive survey of adult needs has been made, but it is fair to presume that it would not differ from that of the children. Translated into figures, this would indicate that every dentist in the United States should take care of 400 children in addition to his adult patients.

Eliminate those who limit their practice, such as the specialists in orthodontia, exodontia, prosthodontia and oral surgery; those who do not like children's work and who do only emergency work; those who have not had special training in children's work, and those who have educated the parents to believe that because children's teeth are only temporary, they are not important and should be looked after only to the extent of relieving suffering, and the figures per dentist increase.

The deciduous teeth should remain in the mouth one fifth of the life of the individual, and that is the most important period, when the child's growth, development and future health depend so much on the ability to eat properly. When, because of the presence of decayed and infected teeth, habits of not masticating food are formed, absorbing pus from abscessed teeth may result in ill health and all the ills that follow this criminal neglect. A child is entitled to a sound body, and the best insurance of this is a healthy mouth with healthy teeth, to prepare the food for assimilation.

How long will the Government allow this neglect of the future citizen? Every citizen whose health is impaired, who becomes an invalid or who might become a public charge is a burden. The Government may begin to examine the source of the trouble, and if the profession cannot take care of such problems, the Government will. Our profession has for generations been sowing the wind and it is now reaping the whirlwind. Can we say with honesty that we are not responsible for the conditon that exists? We have educated the public in the belief that because children would soon lose their deciduous teeth, it was not worth while to bother with these teeth. Therefore, the public, taking us at our word, felt that it was of so little consequence that no money was appropriated in the family budget for dental care other than orthodontia. The cry of the profession now is that people will not pay for having children's teeth cared for. This is true in many cases; but do they hesitate to pay the orthodontist? Would so much orthodontia be necessary if the child had proper dental care? Would so much medical care be necessary if the child had proper dental care? Let us be honest. The fact that 25,000,000 children between the ages of 6 and 15 need dental care is an indictment of our profession, and the honest thing to do is to plead guilty, to throw ourselves on the mercy of the court (the American public) and begin to reeducate the people.

The fallacy of blaming an overcrowded profession for conditions scarcely needs refutation. Increasing the preliminary requirements in dental schools will result only in turning away from our profession numbers of fine persons who would help solve our problems. What we need is not fewer dentists, but better dentists. What the public needs is more intelligent instruction as to the importance of dental care for both children and adults, and then *better dentistry*.

QUO VADIS DENTISTRY?—THE ANSWER

By T. E. PURCELL, D.D.S., St. Louis, Mo.

IN his report to the board of overseers of Harvard University, President Conant offers some interesting and original observations.

Students, in Dr. Conant's opinion, almost all fall into two groups: those who have linguistic and literary ability, and those who have more capacity for mathematics and science. Hence, they should be sorted out with more skill and so failures be avoided. In the field of research, he hopes "to discourage trivial investigation and encourage the significant—to foster in particular that scholarly work that promises to open new areas for exploration or bring to light new relationships hitherto but dimly appreciated." "Applied scientists," President Conant says, "need special attention from the spiritual side with the 'deserts' that overdevelopment of technology might produce. The applied scientist, essential for a smooth operation of the complex mechanism, might be the only man with a true education. Their position would be similar to the monks in the Dark Ages, as transmitters of a spiritual civilization."

In reading Dr. Conant's statement, one would almost believe that he had in mind our profession, when he states: "Students should be sorted out with more skill, and so failures be avoided."

Unfortunately failures do not all occur where they should, early in the dental course. Frequently, students "get by" and go out into practice and the failure occurs. The higher the predental requirements, the greater the number of students who will "get by" because of their educational background, and the more numerous the "synthetic" dentists.

Again, Dr. Conant suggests that, in the field of research, we must endeavor to discourage trivial investigation and encourage the significant. There is no field wherein research has greater opportunity or that means more in health service than dentistry. But we must remember that students who succeed in research are born, not made.

As to the cause of dental caries, we have proponents of the following theories: acid fermentation; dietary deficiencies; the physical nature of diet in distinction from its chemical composition; vitamin deficiency; endocrine disturbance; the theory of specific infection, and heredity.

Like the blind men of Hindustan, who tried to describe the elephant, all were right and all were wrong. All glory to those persons who have gone far afield in their enthusiasm, for out of their work will come the solution of this very serious problem. When it comes, it will be from the biologic, chemical or physiologic laboratory, from whence came the great discoveries of the medical world. The dental schools are in need of endowments that will permit the equipping of such laboratories and the placing in charge of competent research students, devoting their entire time to dental problems. When we secure as students only those suited by the "trend of their ability," we can raise the educational standards of

our profession, and make our entrance requirements as high as we wish, because we will be dealing with applicants who wish to become dentists and who have some natural ability. We will have done with "the trial and error method."

The importance of guidance of the young student into educational activities which will contribute effectively to his educational growth has been recognized for a long time. Practice in all our educational institutions has not kept pace with educational theory. The ability to achieve in certain types of school work can be determined fairly accurately early in the student's school life. When he is ready to enter high school, educational guidance should be able to direct his activities within certain limits. For example, if he has shown as the results of a reliable testing program and as a result of his school achievement that he has neither the necessary ability nor the interest or inclination to study foreign languages, he should be directed into types of school activities in which he is able to succeed. Parents may be the greatest obstacle to such procedure. For the sake of the future happiness and success of the young student, the schools must assume greater authority, based on scientific study in directing educational activities of individual students. That is a responsibility schools must share with parents.

Educational guidance is most effective when it leads to directing the student later into the vocation wherein lies his greatest interest and for which he has the necessary ability. With scientific educational guidance based on facts that can be determined with fair reliability, the abilities and educational limitations of students can be ascertained during their senior high school course, if not before. During the latter high school course, provisions should be made for effective vocational guidance. This involves personal contacts with the student by trained teachers familiar with the ability required of a student in order to make a success in the various professional courses, as well as the trades, general cultural courses or business. For example, a certain dexterity of the hands and fingers is necessary, among other abilities, to make a success in the dental profession. A student who is succeeding in the manual arts and has the ability to draw what he sees in his biology course in high school, together with fair mental capacity, is more likely to succeed than a classical student who has no ability in the manual arts or in drawing.

From the large percentage of students who fail during the first year of their college work, it should be evident to those who are in charge of our educational institutions that greater attention must be given to educational and vocational guidance work. Much can be accomplished in our elementary and secondary schools.

Public opinion must be awakened so that parents may realize the importance of accepting the school's advice, when such advice is based on a scientific study of the individual student. The higher institutions must also cooperate with the secondary schools if definite results are to be obtained. The number of failures of students who enter the professional courses and the number of misfits in the professions are not to the credit of those in charge of our professional schools. Such failures and misfits could be prevented to a great extent if a prerequisite for professional courses were set up. The fact that a student has sixty semester hours of college credit or even an A.B. degree is no assurance that he will succeed in a profession that requires abilities which he does not have. Instead of requiring evidence of such aptitude, we

are still committed to the trial and error plan of admitting every student who meets the credit requirements to our professional courses. A predental or a premedical course should determine whether the student has the ability and the inclination to succeed in these professions. Does it? The reason it does not is that these professions are not requiring any evidence as yet that a student will succeed. Hours of general college credit are certainly no evidence.

PROCEEDINGS OF THE FOURTH GENERAL MEETING OF THE AMERICAN ASSOCIATION OF DENTAL EDITORS*

ABSTRACT OF THE MINUTES

MORE than forty editors of nonproprietary dental journals attended the fourth annual meeting of the American Association of Dental Editors, held at the Hotel Lowry, St. Paul, Minn., Aug. 4, 1934. The sessions were called to order by the president, William R. Davis, and the following instructive program was presented:

Morning session: 1. J. R. Bruce, president of the Bruce Publishing Co., St. Paul: "Graphic Arts and Engravers' Code and Publishing Costs." 2. Anna Dickie Oleson, state director of the National Emergency Council of Minnesota: "Enforcement of the Codes." 3. Herbert Lefkowitz, of the *St. Paul Dispatch:* "Editorial Writing." 4. Harold S. Smith, of the Council on Dental Therapeutics of the American Dental Association: "Dental Therapeutics and Dental Journalism." 5. Frederick A. Keys, editor of the *Apollonian:* "The Ideals of Dental Journalism." 6. Albert L. Midgley, secretary of the American College of Dentists: "The Responsibility of the American Dental Association in Dental Literature."

Afternoon session: 1. A. C. Wherry, president of the American Dental Association, address. 2. Minutes of third annual meeting, read and approved. 3. Report of treasurer showing credit balance of $196.24, accepted and filed. 4. William R. Davis: presidential address. 5. Reports of Committees: (*a*) Dental literature, including resolutions which were adopted. (*b*) Advertising. (*c*) Executive. (*d*) Cooperation. (All accepted and filed.) Election of officers for 1934-1935.

Evening session: Dinner, William R. Davis, toastmaster. Address by Kenneth Olson, of the department of Journalism, University of Minnesota: "A Newspaper Man Looks at Dental Journalism." Others who spoke during the evening were: C. N. Johnson, Bissell B. Palmer, William J. Gies, F. A. Delabarre, J. Ben Robinson and John E. Gurley.

EXTRACTS

President's address: As a result of the study and recommendation of the Commission on Journalism of the American College of Dentists, the American Association of Dental Editors was organized three years ago to further the cause of nonproprietary dental journalism.

Without entering into a controversy concerning the two types of journalism, certain facts we believe are pertinent: 1.

*St. Paul, Minn., Aug. 4, 1934, Otto W. Brandhorst, D.D.S., St. Louis, Mo., Secretary.

As a profession develops, nonproprietary periodicals assume an increasing importance. 2. The problems of editing and publishing nonproprietary periodicals are very different from those associated with proprietary ones. 3. The main purposes for which they each exist are entirely different. 4. The problems of editing and publishing nonproprietary dental journals are not usually discussed at dental meetings. Granted the foregoing facts, there would seem to be a useful and desirable place for our Association. There are about four score or more nonproprietary dental periodicals with peculiar mutual problems and responsibilities, which have been functioning independently of each other. An active organization of the editors of such a group for discussion and cooperation certainly has possibilities. Most dental editors have had no previous experience and have only a limited time for editorial work. In many cases, the tenure of office is so short that a change takes place before much efficiency has been developed. Organizations can be encouraged to seek out for their editor one who has a reasonable amount of time and inclination for such service, and then keep him in the position for a satisfactory period of time.

Perhaps the most vital of all our problems is that of financial support. Most of our nonproprietary periodicals are sponsored by dental organizations with modest incomes and very limited amounts for their official organ. Advertising has been depended on to supply most of the lubricant to keep the wheels turning and that has dwindled alarmingly in recent years. Many of these publications have been forced to reduce space, curtail the amount used for illustrations and draw more heavily upon the parent organization to keep going. With this situation in mind, the administration this year set out to try to get under way two things that had already been recommended and which your president believed had the greatest possibilities of real service. One was the syndicating of excellent short articles, which would be offered simultaneously to all our members, and the other to encourage the activity of our committee on advertising, which would ultimately lead to a practical cooperative advertising service.

Dentistry should strengthen its professional and scientific attitudes toward all of its problems. The professional attitude is one of devotion to altruistic principles. The scientific attitude is one of devotion to truth. It may be difficult for us as editors always to interpret correctly these attitudes and to present them clearly to our readers, but it is our duty and responsibility to do our very best toward that end. This association represents practically the whole of organized dentistry. Through our periodicals, we probably have an opportunity to wield a greater influence than has any other agency. Here is a challenge that should make us consider well what that influence shall be. Never was unselfish, constructive, intelligent leadership more needed in every branch of our profession. Can we as editors help to develop and uphold such leadership? If dentistry is to progress, its nonproprietary periodicals must assume an increasingly greater importance. This organization has before it alluring possibilities of usefulness.

Reports of committees: Committee on Dental Literature, William J. Gies, chairman. Action by dental faculties (as urged in April *Apollonian* in endorsement of the same suggestion by the editor of the *Contact Point* last February) has already ensued at the University of Pittsburgh, May 10, and at Marquette University, June 4. The dental faculties of both these universities have unanimously agreed that hereafter none

of their members will contribute articles for publication in trade-house journals, and will refrain from participating in the programs of societies whose proceedings are published in such journals. Recently, ownership of the *Texas Dental Journal* was transferred by the A. B. Cary Company to the Texas State Dental Society. The *Pacific Dental Gazette,* lately issued in combination with the *Journal of the Southern California State Dental Association,* has been discontinued, leaving the field to the existing *Journal of the Southern California State Dental Association.* The name "Pacific Dental Gazette" is now applied to a new periodical, which, instead of being a journal purporting to publish dental literature, is, to quote its owners, "a trade journal, designed to carry... trade messages (of the owners) to (their) customers." We commend the voluntary action of the A. P. Cary Company and the James W. Edwards Company in their notable cooperation with the dental profession in their states. Only four of the remaining twenty-five proprietary dental journals are designated as official organs of publication of American dental societies, namely, *Dental Cosmos,* by six societies; *Dental Items of Interest,* by one society; *International Journal of Orthodontia and Dentistry for Children,* by seven societies, and *Southwestern Dental Mirror,* by two societies.

We have a very strong conviction that advertisements should not be interspersed with what purports to be professional literature. In commercial magazines, the reader is forced to wade through advertisements to find what to him may be worth reading, but this should not be required in journals devoted to the affairs of a profession. Advertisements in nonproprietary dental journals should be segregated as a group. Advertisements should not be permitted to require the maintenance of a custom that is an eyesore to all who regard dental journals as agencies primarily for the furtherance of professional ideals and the attainment of professional progress in the public service.

The proportion of such pages (advertising) should be definitely limited by agreement, that the advertisement (tail) may not wag the literature (dog), and the distinction between proprietary and nonproprietary journals, as to non-commercialism, may be made clear and emphatic. (Recommendation.)

RESOLUTIONS (ADOPTED AUG. 4, 1934)

In harmony with the recommendations of the Committee on Dental Literature, be it

Resolved: That the name of the Committee on Dental Literature be changed to Committee on Current Dental Literature.

Resolved: That THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION be requested to publish the proceedings of this meeting in an early issue, and that this association offer to pay the expense of adding the required number of pages for this purpose. The editor shall have authority to obtain and distribute reprints.

Resolved: That the periodicals represented in this association be requested to publish the report of the Committee on Advertising as presented at our meeting in 1932.

Resolved: That the Committee on Advertising be instructed to endeavor to effect an early agreement, among the periodicals represented in this association, to segregate all advertisements at the end of the issues containing them.

Resolved: That the Committee on Cooperation be instructed to collect and recurrently distribute to member periodicals "telling" excerpts, intended to develop both a higher sense of professional

ethics and an appreciation of better dental literature.

Resolved: That a special committee be appointed to recommend a procedure to express annually this association's appreciation of the nonproprietary periodicals that merit special approval.

Resolved: That we convey to the American College of Dentists this association's commendation of the continued effort of the American College of Dentists through its commission on journalism to convert or merge all proprietary dental journals into nonproprietary periodicals.

Resolved: That we convey to the dental faculties in the University of Pittsburgh and Marquette University this association's commendation for their notable action in support of nonproprietary dental journalism; and that copies of the resolutions in this regard as adopted by these faculties, and a copy of this resolution be sent to each dental faculty in Canada and the United States.

Resolved: That we convey to the A. P. Cary Company and the James W. Edwards Company this association's appreciation of their cooperation with the dental profession in their states for the promotion of nonproprietary dental journalism, and that copies of this resolution be sent to the two companies named herein and also to the owners of all proprietary dental journals in the United States.

Resolved: That we convey to the *Journal of Dental Research* and the *Journal of the American College of Dentists* this association's appreciation of the generosity of these journals in publishing the proceedings of our meetings in 1932 and 1933, respectively.

Resolved: That this association commends to the special consideration of the dental profession the journals that are conducted by the students in dental schools. These journals represent the insight, idealism, courage and professional purpose of a coming generation of dental editors, and likewise foster the cumulative development of experience and ability in dental journalism, and also a leadership that will seek to serve the public cause of a profession rather than the private interests of a trade house.

Resolved: That copies of this resolution be sent to each dental-student periodical, and also to the deans of all dental schools in Canada and the United States, for presentation to each faculty and to each student-body.

Resolved: That any nonproprietary dental periodicals in the United States not now represented in the membership of this association be invited to become members.

EXTRACTS; REPORTS OF COMMITTEES

Committee on Advertising (Bissell B. Palmer, Chairman): As its principle task, the Committee on Advertising has undertaken an investigation of the methods used by the state medical journals to obtain advertisements through a cooperative arrangement. The committee believes that it would be advantageous for the state dental journals to join in a cooperative advertising movement and that probably other nonproprietary dental journals would find it practicable to participate in the arrangement.

Committee on Cooperation (U. G. Rickert, chairman): This committee was asked by the president, William R. Davis, to syndicate articles of general new interest. Your willingness to cooperate and your encouraging letters give us evidence that we should experiment further in this direction. Our final recommendations are:

1. A frank general discussion as to how the syndication of articles may be made most effective.

2. The appointment of a committee to continue the study of the subject if the plan seems feasible.

3. Provision of funds for its continuation.

4. A more frequent exchange of important editorials among our members, to be published under the name of the corresponding editor.

OFFICERS AND COMMITTEES, 1934-1935

Officers: President, John E. Gurley; vice-president, William J. Gies; secretary-treasurer, O. W. Brandhorst; editor, Grace Rogers Spalding.

Committees: 1. Advertising: C. W. Freeman, chairman, William R. Davis, C. S. Foster. 2. Bylaws: O. W. Brandhorst, chairman, E. A. Thomas, Walter Hyde. 3. Cooperation: U. G. Rickert, chairman, Ingo Hackh, F. A. Keyes. 4. Current Dental Literature: Grace R. Spalding, chairman, C. N. Johnson, Theodor Rosebury. 5. Executive: E. A. Thomas, chairman, T. F. McBride, Walter Hyde. 6. Nominating: John T. O'Rourke, chairman, G. W. Duncan, L. E. Van Kirk.

ANNOUNCEMENT

The fifth general meeting of the American Association of Dental Editors will be held in New Orleans, Saturday, Nov. 2, 1935.

AZOCHLORAMID IN ROOT CANAL ANTISEPSIS

By H. J. ROSS, D.D.S., New York City

THE problem of root canal sterilization is one of the most important that have engaged the attention of the profession since its earliest days. It has been a source of discussion and contention between the best minds in dentistry and one that must be solved without question before the practice of dentistry can be said to be on a firm and solid foundation. Much depends on whether a pulpless tooth can be rendered sterile.

It is needless to go into the question of the relation of the infected pulpless tooth to systemic disease. The literature of the past ten years is full of discussions relating to this problem. Its effect is not open to question. Unfortunately, there are those who believe that no tooth can be rendered permanently sterile, and who point to the evils of systemic infection and therefore advise radical extraction. On the other hand, there are thousands of cases of pulpless teeth that have remained in the mouth for years, rendering valuable service and without any harm to the patient. The desirability of retaining the tooth, if it can be rendered sterile, is unquestioned by both sides, and it will be admitted by all that the sterile pulpless tooth, well filled, is no menace and may be retained with great benefit to the patient. The problem, therefore, becomes limited to the ability of the dentist to sterilize the infected tooth and the adjacent periapical tissues. In reviewing the literature of recent years, it is evident that the essential truth, that the tooth must first be sterile, has been minimized in favor of the necessity for having the root canal well filled, and the degree of filling of the canal has evoked much more discussion than the necessity for sterilizing the tooth. For instance, in

extended discussions of root canal filling, much is written of the relative merits of filling to the dentinocemental junction and of overfilling the canal. Again, the substance of which the root canal filling consists is considered of great importance, whether guttapercha, gold cones or lead wires, or a mixture of amalgam, of gold and tin, etc. Much emphasis is placed on the mechanical features of root canal technic, but relatively little on the actual sterilization of the infected dentin. It would seem at times that the accepted belief is that it is impossible to sterilize the dentin and, therefore, that the best that can be done is to bottle the bacteria up in the tooth to prevent their escape into the periapical tissues. The fallacy of this is apparent, when we study the structure of the root end and find that, in the vast majority of cases, there exist accessory foramina and that, therefore, mechanical treatment alone cannot be relied on to prevent infection of the periapical tissues. The failure to sterilize the dentin effectively is also one of the reasons for unsuccessful apicoectomy. Again, it is extremely difficult in instrumentation to prevent the passage of débris through the apical foramen, and the failure to sterilize the contents of the canal carefully as the canal is opened further will result in infection of the periapical tissue, with consequent irritation and sometimes extensive destruction. Many pulps may be necrotic in the pulp chamber and the first portion of the canal and, at the same time, be vital in the periapical region. All such teeth must be operated on without infecting, or producing a chemical irritation of, the periapical tissue.

While it is understood that one of the important phases of root canal sterilization consists of the mechanical and chemical removal of débris, and widening and opening of the canal, thus rendering the tooth more accessible to the influence of the antiseptic used to destroy the invading organisms, not enough attention has been paid to the actual sterilization of the tooth. The Editor of THE JOURNAL[1] makes the following interesting note:

In some instances, pulpless teeth show a tendency to irritability or sensitiveness in canals near the apex while being treated, especially if a broach is used for thorough cleaning of the canals. Under such circumstances, it is always advisable to let the tooth rest before attempting to insert a root filling till the irritation has entirely subsided. To insure the canals against infection during the subsidence of the soreness, a paste may be made by mixing formocresol and oxide of zinc, incorporating it in some fibers of cotton, placing this without pressure in the canals and covering the whole with oxyphosphate of zinc cement to fill the cavity. A filling of the kind may safely be left in as long as several months if necessary, at the end of which time all soreness will be gone and the canals will be found clean and sterile and may be filled in the usual way. It is seldom desirable to fill canals while there is irritation at the apex of the root.

It might be asked if, in this respect, the tooth is clean and sterile, why the necessity for the root canal filling? All of this indicates that the *sine qua non* of successful root canal therapy is not the excellence of the root canal filling, but the sterility of the tooth, and the conservative treatment of pulpless teeth can be regarded as safe only if this is accomplished.

MODERN CONCEPT OF ROOT CANAL THERAPY

Grossman[2] states the case succinctly:

The dawn of a better root-canal therapy began with the introduction of an aseptic

1. Practice in Paragraphs, J.A.D.A., 21:1686 (Sept.) 1934.

2. Grossman, L. I.: Treatment of Periapical Infection by Conservative Methods, J.A.D.A., 21:1669 (Aug.) 1934.

technic, when the principles of asepsis rather than antisepsis were introduced into dental practice. This marked a distinct departure from the previous concept of root-canal management, with the attainment of better results. I believe that still better results can be expected just as soon as we come to apply bacteriologic methods with greater frequency to determine whether the periapical area is sterile before the canal is filled.

Innumerable references can be made to reports of workers indicating that given a sterile tooth, the tooth may be retained with safety, and that there is a filling in of the apical foramina with osteoid or cementoid tissue. Grossman also quotes Hatton as follows:

The nature of the changes that take place after the tooth is filled is similar to the healing of a broken bone. First, there is a period in which the necrotic and damaged tissues are removed or resorbed. Second, there occurs a regenerating phase in which new tissues are formed in the apical region and about the filling material. The dentins and cementum of the apex both inside and outside of the canal are covered by new layers of osteoid cementum which is quite dense and solid. Occasionally this layer even covers the filling material.

Grossman's conclusions are "(1) that at least in some instances the periapical area of a pulpless tooth can be rendered safe to the patient as determined by roentgenologic, bacteriologic and histologic criteria; and (2) that once rendered sterile, the periapical area will probably remain so." The latter statement is a most important one and is in accord with my belief that the chance of hematogenic infection of a sterile pulpless tooth is remote.

METHODS OF STERILIZATION

From the foregoing discussion, we must come to the conclusion that the secret of successful root canal therapy is in the sterilization of the tooth, accomplished by (1) the mechanical and chemical preparation of the tooth and (2) the therapeutic treatment. To effect sterilization of the tooth, we must resort to one of two methods: (1) the direct application of the antiseptic to the canal or (2) electrosterilization, using solutions of the halogen salts. The first is the one used most universally, as it is the simplest. The second, while undeniably very effective, is, because of the necessity for apparatus and consequent adjustment of operating technic, limited in its use.

The selection of a suitable medicament for root canal sterilization has been a difficult problem. Practically every drug with any antiseptic value has been used, with varying results. Of these may be mentioned the essential oils: thymol, eugenol, eucalyptol, also formaldehyde, creosote, formocresol, chlorphenol, camphorated phenol, cresol, the salts of metals, such as mercury bichloride and silver nitrate, various iodides and many others, and some of recent discovery, such as hexylresorcinol and sodium ricinoleate. One of the most popular of root canal antiseptics used in this country at the present time is formocresol, a mixture introduced by Gysi and widely popularized by Buckley. Of this, Prinz[3] wrote prior to 1928:

The true criterion of an antiseptic must be based upon its bacteriologic efficiency as tested in clinical cases. The high standard of germicidal activity of formalin has been frequently established by rigorous experiments. Clinical data collected in the early days of the use of this mixture pointed to most favorable results. In due time, it was observed that while "clearing up" an infected root canal as far as ordinary diagnostic evidence is concerned as applied in the average dental office, i. e., absence

3. Prinz, Hermann: Diseases of Soft Structures of Teeth and Their Treatment, Philadelphia: Lea & Febiger, 1928.

of foul odors, occurred much more rapidly from the use of this mixture than from any of the numerous other drugs usually advocated for the purpose, secondary manifestations about the periapical tissues were of frequent occurrence. These disturbances are an indication that the supposed sterility of the canal was not obtained at the time of its treatment with the cresol formalin mixture or that this compound produces a predisposition of the periapical tissues to future infection. To be sure, dental literature is replete with statements such as this (referring to the cresol formalin mixture): "This dressing should remain for at least three days, by which time the remedy will have sterilized the entire tubular structure of the dentin, thus establishing asepsis." As no bacteriologic proof is furnished to substantiate this statement, it is out of harmony with existing facts. Asepsis of the surface of an infected root canal can be temporarily established by applying mechanical and chemical measures, but complete sterilization of the "entire tubular structure of dentin" *in situ* is impossible with the methods at present in vogue.

The foregoing arraignment draws attention to the marked contrast between root canal therapy empirically carried out and the logical carefully checked method of applying bacteriologic principles cited by Grossman.

Prinz has laid down for the use of drugs criteria which are of great value:

In regard to the application of powerful antiseptic drugs for the treatment of infected root canals, one should always be mindful of the following facts:

(1) The agent must be able to develop the highest degree of antiseptic power without doing harm to the periapical tissues.

(2) It must maintain its activity for at least 24 hours when sealed into the root canal.

(3) It must not cause pain.

(4) It must not discolor tooth structure.

As suggested by Prinz, there are three important factors of germicidal action which must be observed in all cases: "Absolute contact, time during which the contact is maintained, and sufficient concentration of the employed antiseptic."

Coolidge[4] says:

The principle of contact brings up the question of the penetration of germicides and the relative value of drugs in actually destroying organisms deeply sealed in multicanaliculated root canals containing gangrenous and putrescent organic material and it is possible that some dentinal tubules might harbor organisms as well. Organisms protected by decomposed organic material must be reached by the germicide before they can be destroyed. The concentration of the drug and the time required to destroy the organisms must always be determined by laboratory tests to prove the efficiency of the treatment. In addition, it is equally important that the germicide be not highly irritating to the tissue. The success of the root canal treatment must be judged by the picture of the periapical tissue and bone as revealed by the roentgenogram. Drugs that severely irritate are destructive and cause bone and tissue changes to appear in the periapical area which are difficult to differentiate from similar areas caused by toxic products of micro-organisms or by the organisms themselves. Organisms growing at the surface of an exposed pulp must be destroyed without causing pain when the germicide is sealed on the exposed but still vital pulp. This is one of the most important steps in the treatment of root canals, since the same organisms may be found in carious dentin and at the surface of the exposed pulp as are found deeper in the root canal containing a necrotic pulp. Drugs which coagulate protein have only a shallow penetration and are not qualified for the treatment of infected canals containing organic matter.

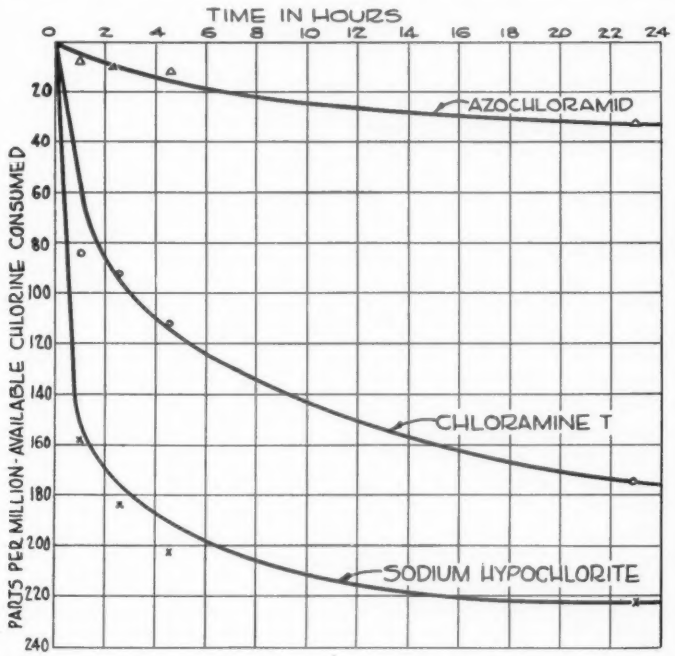
An important consideration is the

4. Coolidge, E. D.: Studies of Germicides for Treatment of Root Canals, J.A.D.A., 16: 702 (April) 1929.

length of time during which the germicide is expected to remain active or unexhausted. Some drugs, such as the chlorine preparations, heretofore described, have a short period of effectiveness and must be replaced at rather short intervals owing to their great solubility or chemical activity. This instability of chlorine compounds has been a great drawback to their use in the past. Still, the preference of chlorine in its nascent state is expressed by Prinz and by Aiguier,[5] who recommend either electrosterilization or topical application. Drugs that coagulate albumin are unsuitable because (1) they are self-limiting in their action and (2) they may produce serious injury to the periapical tissues. None of the chlorine yielding compounds act in such a manner. Further, the chlorine penetrates the canals and inaccessible spaces and neutralizes both toxic products and the gases of putrefaction.[6]

Prinz says:

Of all known antiseptics, chlorine freshly prepared and in the presence of moisture and in a suitable concentration, especially in an oily solution, is harmless to the periapical tissues and it maintains its activity for about twenty-four hours when sealed in a root canal. The oily chlorine solutions will not cause pain and they do not discolor but rather bleach tooth struc-


TIME IN HOURS
0 2 4 6 8 10 12 14 16 18 20 22 24
PARTS PER MILLION AVAILABLE CHLORINE CONSUMED
20 40 60 80 100 120 140 160 180 200 220 240
AZOCHLORAMID
CHLORAMINE T
SODIUM HYPOCHLORITE

Differential consumption of chlorine from chlorine antiseptics by human pleural exudate (10 per cent mixed with equal volume of chlorinating solution).

5. Aiguier, J. E.: Use of Drugs in Dentistry: Administration, Application and Limitations, J.A.D.A., 17:1433 (Aug.) 1930.

6. Footnote 3, p. 186.

ture. At the moment chlorine is considered "King" among the chemical disinfectants. When freshly prepared in the presence of moisture and a suitable temperature, it is the most active disinfectant known.

The attempt to use chlorine solutions in root canal treatment has been beset with difficulties owing to the instability of the solutions; for, in root canal antiseptics, viewpoints somewhat different from those prevalent when antiseptic action in other infections is considered are of importance. Surgical solution of chlorinated soda (Dakin's) with its complicated and time consuming technic, as well as the solution employed itself, is practically useless for the treatment of infected root canals. Because only very small amounts of the antiseptic can be used at a time, the limitation placed on root canal antiseptics of this type allows us to consider only those which, in addition to some of the stipulations as quoted above (1) have a lasting effect; (2) are not appreciably interfered with by the presence of organic matter; (3) have no marked specific action and are thus applicable to mixed infections; (4) have extreme penetrating effect, and (5) are not dangerous from the point of view of resorption.

The chloramines, such as monochloramine-T and dichloramine-T, have been the subject of many investigations and have been clinically used for some time. Objections which can be raised against them are the fact that their action is appreciably interfered with by the presence of organic matter, such as the serious discharge and the pus which can be encountered in putrescent root canals; that their action, while considerably more prolonged than that of surgical solution of chlorinated soda is still not lasting enough, and, finally, in some cases, they are too irritating and act too much as lymphagogues.

Dichloramine-T is unstable, and if the operator is not watchful, it will deteriorate, becoming irritating, so that the condition may be more aggravated than relieved. This has caused the gradual discontinuance of its use. Recently, a solution of monochlorphenol in camphor has received considerable attention. It is asserted[6] that, in 50 per cent solution, this medicament will slowly liberate nascent chlorine in the presence of active phenol, the camphor modifying the phenol; also that the drug is active for from twenty-four to forty-eight hours. This statement regarding liberation of chlorine is contrary to fact.

AZOCHLORAMID

Seeking a chlorine antiseptic suitable for root canal therapy, I learned in the latter part of 1932 of azochloramid, an entirely new organic chlorine, which was first described by Schmelkes and Marks,[7] Schmelkes and Guiteras,[8] Schmelkes and Horning, and Schmelkes *et al.*[9] It appeared at once that the objections which had been raised against the chloramine compounds known heretofore had been successfully overcome.

Azochloramid is said by these authors to be distinguished from other chlorine compounds by considerably increased stability as far as both the aging of solutions and their action in contact with organic matter is concerned, owing to a materially lower degree of dissociation, causing the release of very much smaller amounts of free chlorine than in other chlorine compounds. Other consequences of this basic property are: absence of chlorine odor and taste and considerable reduction in the minimum effective concentration.

7. Schmelkes, F. C., and Marks, H. C.: J. Am. Chem. Soc., 56:1610 (July) 1934.

8. Schmelkes, F. C., and Guiteras, A. F.: J. Biol. Chem., 107:235 (Oct.) 1934.

9. Schmelkes, F. C., et al.: J. Bacteriology, 27:36, 1934.

Particularly in the presence of organic matter, together with the low degree of interaction, this lowering of the minimum effective concentration permits the use of medications which, at least as far as chlorine compounds go, are of a heretofore unattained low degree of irritation. Moreover, like other chlorine compounds, but unlike all other antiseptics, azochloramid is not markedly group specific, destroying most types of micro-organisms with equal facility and thus especially adapted to mixed infections. The low degree of interaction of azochloramid with organic matter, as compared to other chlorine compounds, is strikingly shown in the accompanying diagram, where the decline of the concentration of available oxidizing bactericidal chlorine during a twenty-four hour period in the presence of pleural exudate in solutions of free chlorine compounds of initially equal chlorine concentration is depicted. It is shown that even after twenty-four hours in the incubator, most of the azochloramid originally added is still active. The activity of the surgical solution of chlorinated soda has dropped to 10 per cent after four hours and that of the chloramine-T to 50 per cent after four hours. It is this property in particular which is of such value in a root canal antiseptic. It assures the lasting effect of a dressing placed in the canal and not removed until after several days. Heretofore, compounds relying on oxidizing chlorine for their sterilizing ability had to be replaced and dressings changed more frequently; otherwise, their effect diminished very rapidly, and any infections not eradicated in their first period of activity had an opportunity to grow back. This is obviated when azochloramid is used.

DIAGRAM

A quick test for the presence of otherwise invisible quantities of azochloramid is the acidulated starch-iodide test. In this test, the material to be investigated is brought in contact with a small quantity of potassium iodide solution acidulated with acetic acid or hydrochloric acid containing a small quantity of starch solution. The presence of azochloramid (and most other oxidizing compounds, such as iodine) causes this solution to assume a blue to black hue owing to the formation of free iodine, which forms the characteristic complex with starch. This test was used as an indicator to trace the degree of penetration of azochloramid through pulpless teeth. Teeth freshly removed in pyorrhea cases (in order to avoid undue strain on the tooth structure during extraction) were opened in the crown, and the pulp was removed, the canal cleared and the tooth set in a small block of cement. The root canal was then filled with an azochloramid dressing, just as if the tooth were still under treatment in a patient's mouth. Subsequently, after a day or two, test borings were made through the cementum and small droplets of acidulated potassium iodide-starch solution placed in contact with the dentin at the dentinocemental junction. The appearance of the dark color in most instances showed that during a twenty-four hour period, at least in the tooth under the conditions described, penetration of the dentin was accomplished.

This opens a vista in the treatment of infected teeth which heretofore has been closed to the dental profession. Experiments to determine whether this penetration is obtained with equal facility in teeth which are still intact in a living person are now being carried out elsewhere and, I understand, will be reported later. The facilities available in a well-equipped dental office do not permit me a more detailed inquiry into this problem.

The efficiency of azochloramid as a root canal antiseptic was then tested in

sixty-three consecutive cases of root canal infection which occurred in my practice between November, 1932, and Sept. 1, 1934.

METHOD OF USE

In carrying out an investigation into the merits of azochloramid as a root canal antiseptic, a series of experiments were instituted which at once indicated the effectiveness of this new compound, the results being extremely gratifying.

Owing to the fact that azochloramid was placed at my disposal in various medications, some of which have been discontinued after these experiments, I will confine myself to describing the method which I have used in the last twenty-two cases out of a total of sixty-three. In these cases, azochloramid in triacetin in a concentration of 1:100 was used, applied by saturating an azochloramid paper point in the azochloramid solution and sealing it in the canal. The method used in all these cases followed in general that established by Prinz and the syllabus of the University of Pennsylvania. All treatment was done under the rubber dam and every precaution taken to insure asepsis. All instruments were sterilized in the Flaherty molten metal sterilizer before touching the tooth. All cotton was sterilized as well. The teeth were sealed with double guttapercha seals to insure freedom from seepage. Only mechanical means, by the use of files and reamers, were used for opening and enlarging the canals to avoid masking the effectiveness of the azochloramid by the use of strong chemical reagents.

While the number of sittings for the individual case was determined by its own necessity, the progress of the treatment was gradual and cultures were taken at each sitting to determine the state of the case. The culture medium used was Rosenau's brain-heart infusion and the method of culturing was by means of sterile absorbent points, which were placed in the canal for a period ranging from ten seconds in the first twenty cases to a minute or longer in the later cases of the series, and then dropped into a tube of the culture medium and incubated. The variation in the length of time that the sterile point was left in the canal affected the number of positive cultures obtained, a slight increase being noted when the point remained in the tooth for a longer period. In ten cases, a separate sterile paper was inserted and sealed in the canal for at least forty-eight hours after the first negative culture was obtained and subsequently cultured. These were all found to be negative. Of these, one case was especially interesting:

April 28, 1933, Mrs. S. had the root canal of an upper left central incisor opened, and a culture taken. The culture was found positive. A special azochloramid point was moistened in azochloramid poppy seed oil, inserted and sealed.

May 2, the root canal was opened, and the point removed and cultured. It was found negative. The tooth was opened farther and cultured once again and found to be negative. Then the azochloramid paper point was inserted and sealed.

May 9, the root canal was opened, and the point was removed and cultured and found negative. Then a sterile paper point was inserted and sealed.

May 17, a sterile paper point was removed, cultured and found negative. Another sterile paper point was put in and was not removed until May 31, at which time the tooth was cultured, again being found negative.

June 12, the root canal was filled. There was no pain nor discomfort, and a roentgenogram showed that no change had taken place.

This case was interesting because of the fact that it was a retreatment case. The tooth had been filled several years

before, the canal having been filled incompletely. There was a definite rarefied area in the periapical region and the cultures taken on removing the root canal filling mechanically were found to be positive. The canal was treated over a period of practically two months, the number of visits being five and the visits so spaced and the treatments so carried out as to determine the lasting effect of the antiseptic. The treatment in this fashion provided ample opportunity for organisms to grow back, and the fact that the tooth was found to be sterile after such an interval of time indicates the efficiency of azochloramid.

Of sixty-three cases which have been treated with azochloramid medication, in nineteen there was devitalization due to pulp exposure secondary to caries. Every one of these cases was cultured and found to be positive. These required an average of three sittings. Negative cultures were obtained in one treatment, except in three cases, in which two treatments were necessary. Eleven were cases of acute simple pulpitis; eight, of acute suppurative pulpitis; eleven, of chronic ulcerative pulpitis; three, of chronic suppurative pulpitis, and five, of chronic proliferative pericementitis.

As an average, the cases of pulpitis required two treatments before negative cultures were obtained. A few required three treatments and one required four treatments, while in one case apicoectomy was resorted to in order to clear up the infection. There were a number of other cases of necrosis and gangrene of the pulp wherein azochloramid was used effectively.

In almost all cases treated, the prognosis basically was good and the periapical destruction had not been great enough to make the outcome doubtful. Root canal therapy was not contraindicated, and the condition of the patient was such that, given an efficient root canal antiseptic, satisfactory disinfection of the root canal could be expected.

These cases have all occurred routinely in an active practice of a better than average type and were a reasonable cross-section of cases requiring root canal therapy. Over a period of ten years, I have used dichloramine-T, formocresol and parachlorophenol in camphorated oil successively as root canal antiseptics. My experience has been that, in about 80 per cent of the cases, disinfection of the root canal using any of these agents could be accomplished in not less than four treatments. In the remainder of 20 per cent of the cases, a protracted treatment has been necessary. Sometimes eight or ten successive applications of root canal antiseptic had to be made before sterile cultures could be obtained. It is remarkable to me that, in the period of twenty months, in which I have used azochloramid medication in a total of sixty-three consecutive cases, I have had only one case in which I decided to carry out root amputation after four treatments and that a case in which the slow drainage encountered indicated this step. In all the cases treated, there has been no occurrence of pericementitis. In the concentration of azochloramid used, I have observed no irritation even when the medicament was pumped beyond the apex of the tooth. Every precaution was taken during treatment to check up on the progress of instrumentation by roentgen-ray examination to avoid mechanical irritation, which might be mistaken for chemical irritation.

SUMMARY

The importance of a satisfactory root canal antiseptic cannot be overemphasized. This question has not received sufficient attention in the past. Chlorine antiseptics, which are basically very desir-

able, have certain limitations which do not make them very suitable for root canal sterilization. Azochloramid, a new chlorine compound, overcomes all the difficulties inherent in chlorine compounds that have been known heretofore. Moreover, it has definitely a penetrating effect and can be relied on to reach those parts of the root canal which cannot be reached by the instrument. There are indications that it penetrates the tubuli and is able to kill bacteria lodging in them.

In a series of sixty-three consecutive cases treated in the last twenty months, successful application of azochloramid in treatment was made.

515 Madison Avenue.

SURGICAL ELIMINATION OF PERIAPICAL PATHOSIS WITHOUT EXTRACTION OF INVOLVED TEETH*

By JULIUS H. LEVINE,† D.M.D., Boston, Mass.

DESPITE all the charges and attacks by both medical and dental practitioners against the devitalization of teeth via pulp extirpation during the past twenty years or so, dentists throughout the country are continuing such practice. Furthermore, the dental profession will, I believe, continue in the practice of devitalization of pulps followed by some form of root canal therapy for many years to come. If that is the case, it behooves us as members of a scientific profession to develop some technic which is simple and practical to the extent that general dentistry will be able to so practice devitalization of pulps and root therapy that these so-called charges will no longer be rightfully made. For, after all, the treating and saving of teeth is a duty of the general practitioner and not the specialist.

It is not my intention to discredit or belittle the value of the zealous labors and investigation or research along these lines of thought by the many investigators of our profession (Kells, Rhein, Callahan, Ottolengui, Blayney, Grove, Coolidge, Noyes, Davis, Rickert and many others). As a result of these labors, various technics have been developed for the proper therapy and filling of root canals, as well as for the elimination of periapical pathosis. I believe it will be generally accepted that these various technics are too delicate, elaborate and expensive—certainly for multirooted teeth and possibly so for single-rooted teeth. If we are to solve the problem of root canal therapy, we must develop a technic which is simple and can be practiced successfully by the general practitioner and for the many patients.

CLASSIFICATION

In an attempt at the solution of this problem, I have divided teeth into four groups or classes: (1) single-rooted teeth that must be devitalized; (2) single-rooted pulpless teeth (putrescent,

*From the Dental Surgery Section of the Beth Israel Hospital.

*Read before the New York Institute of Clinical Oral Pathology, March 26, 1934.

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abscessed or with cystic degeneration) that require root canal therapy; (3) multirooted teeth that must be devitalized, and (4) multirooted pulpless teeth (putrescent, abscessed or with cystic degeneration) that require root canal therapy.

The first group calls for but little discussion. With all the various technics developed by the above-mentioned men, we should be able to handle this group of cases with success. If not, we should give up the attempt at root canal therapy altogether and extract all such teeth. This, you will agree, would be to repudiate our birthright as a profession,

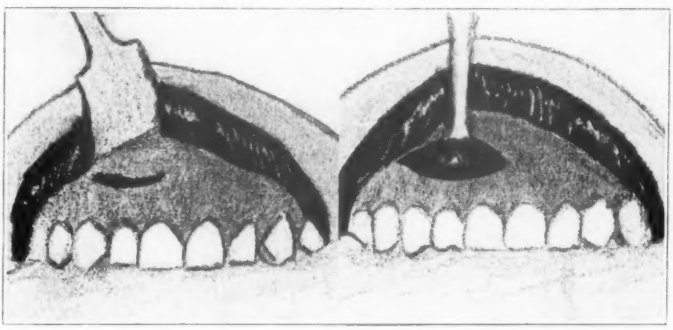

Fig. 1.—Approach to periapical space.

which we are not quite ready to do. Therefore, I shall not present any roentgenographic study of cases in this group. Sufficient reports and studies have already been published by many operators and observers, making any further study entirely unnecessary.

As to the second group, I repeat a statement I made in a previous paper.[1] "All single-rooted teeth, putrescent or otherwise, can be properly treated and filled with reasonable assurance of success—and all apical pathosis can be eradicated, and, if the tooth in question has sufficient healthy bony support, the tooth can be saved." In this group of cases, we are dealing with an entirely different situation. We have a pathologic problem pure and simple, as the organisms at play here are pyogenic in contradistinction to the bacteria of decay, whatever they be. Now if we would only recognize and appreciate the general surgeon's approach to any such problem, the whole problem would be surprisingly simple and clear. If we are to consider ourselves dental surgeons, and we do, we should practice one of the cardinal principles of surgery; namely, when dealing with infection or pus, one must first localize the infection and secondly establish adequate drainage. Until we as a profession recognize and practice this simple principle of surgery, such teeth will be extracted unnecessarily.

The usual reasons for extracting these teeth are pain and the difficulties of treatment. What is the pain and difficulty of treating such putrescent or abscessed teeth, or teeth with cystic degeneration, due to? Pressure of either retained pus or gas. How can we relieve such pain? Only by establishing adequate drainage.

1. Levine, J. H.:Pulp Amputation—Its Justification and Technique, D. Items Int., 55:711 (Sept.) 1933.

And by this I mean establishing a surgical opening into the periapical space through the outer plate of the alveolus. Once that is done, we preclude the possibility of pain from either pus or gas. And once that is done, we can expect the same process and progress of repair and resolution as does the general surgeon when he localizes and evacuates an abscess by means of adequate drainage. The pathology of the mouth is no different from the pathology of any other part of the human organism. The bacteriology may differ, but not the pathology.

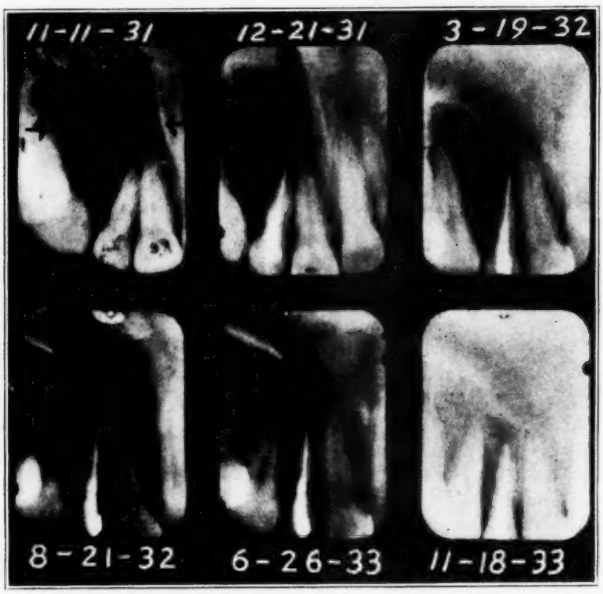

Fig. 2 (Case 1).—Radicular cyst of maxillary lateral incisor; case treated by conservative Partsch operation, resulting in complete elimination of cyst, the teeth assuming the normal position.

At this point, may I explain my position on another phase of this surgical treatment: namely, root amputation, sometimes called root resection or apicoectomy. I do not mean to decry this procedure. Properly done, where indicated, I accept it as a rational surgical procedure. The results of Blum,[2] in which he shows 98 per cent success, should be sufficient proof of its scientific and practical value. But if it is possible to achieve these results without amputating the root end, would it not be more desirable? The factors in the question of saving a single-rooted tooth are not the extent of apical or periapical infection present, but rather the extent of peridental or pericemental pathosis existing. In plain words, it is purely a mechanical problem, for it is the amount of

2. Blum, Theodor: Root Amputation: A Study of One Hundred and Fifty-Nine Cases, J.A.D.A., 17:257 (Feb.) 1930; Additional Notes on Root Amputation, Including Study of Thirty-Eight New Cases, ibid., 19:69 (Jan.) 1932.

bony support of the root that determines the question of retaining a tooth.

I quote from Hatton[3]: "It is my impression that some cases of failure in this operation may be explained as mechanical. There may be a serious lack of coordination between the forces that are brought to bear on the crown of the tooth and its relatively new position in the socket after surgical removal of the apex." Again, I quote from Blum[4]: "One case was not transilluminated before or after as the patient had amputated teeth missing, which she claimed were removed seven years after the operation, stating that they *loosened* and her general health improved after all her pulpless teeth were removed." That being the case, who is there that can prognosticate the future of any tooth and say that any given patient will never develop some degree of alveolar recession or periodontoclasia? How valuable a few millimeters of root tip may some day be, no one can readily determine. It, therefore, seems that a procedure by which we could surgically open the periapical area and eradicate all pathosis without amputation or apicoectomy and have complete bony regeneration follow, would be much more desirable and more conservative.

Fig. 3 (Case 2).—Radicular cyst of first and second molars, treated by conservative Partsch operation, resulting in complete regeneration of bone.

I recognize the necessity of root ampu-

3. Hatton, E. H.: Pulp Abscesses and Root Resection, J.A.D.A., 19:746 (May) 1932.

4. Footnote 2, first reference.

tation where there is definite necrosis of the apex. The tendency has been to amputate too low, leaving too short a root. I also recognize the necessity of amputation in the treatment of a tooth with a radicular cyst if the cyst is enucleated and removed. Here again, the tendency has been to amputate too low; e.g., "to the base of the cystic cavity." We should keep in mind that the actual attachment of the cystic membrane to the tooth is is left in position. This, in turn, becomes transformed into normal mucosa.

TECHNIC OF PERIAPICAL CURETTAGE

Any one with experience knows that the treatment of periapically involved teeth through the canal opening of the tooth has been more or less a failure. In such treatment, every time the canal dressing is removed, it is found wet, moistened by the fluids, whatever they

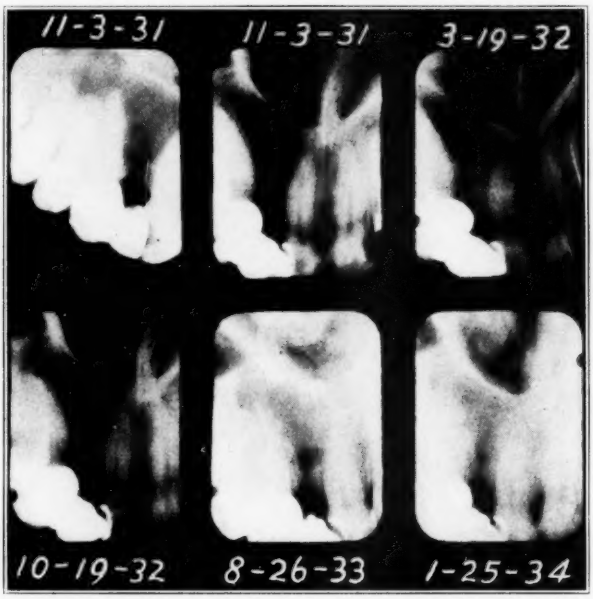

Fig. 4 (Case 3).—Radicular cyst of maxillary lateral incisor, treated by enucleation and showing complete regeneration of bone.

generally near the apex and that it dips down between the pericemental membrane of the involved tooth and the approximating teeth. On the other hand, if the treatment of the cyst is accomplished by the conservative Partsch operation, no amputation at all is necessary, for the reason that the inner membrane are, of the periapical space. And why should it be otherwise? Can we expect drainage through such a fine canal? It is true that the original seat of infection was in the canal; but, by this time, it has gone beyond the canal into the periapical area. Why not, then, approach the periapical area directly? We should bear in

mind that we must first localize the infection before we can treat the case as follows:

1. Under procaine anesthesia, a semilunar incision is made exactly as for a root amputation and the mucosa retracted. (Fig. 1, left.)

2. The condition is localized and the apex and periapical area (Fig. 1, center) are adequately exposed. Of course, in the case of a radicular cyst, this is easily accomplished. Also, in those cases wherein there may be a sinus or fistula, it would be a rather simple procedure. In the absence of either cyst or sinus, there may be some difficulty in locating the periapical area. This can best be accomplished with the help of proper roentgen-ray films, by using a very small round bur. Several openings can be made through the outer plate, if necessary, without harm. With a little experience, one finds the periapical area almost immediately. Then, the openings are enlarged with a large round surgical bur or gouge.

3. After this opening is enlarged, the periapical area is very mildly curetted and cleared of all necrotic tissue or granuloma (Fig. 1, right).

Fig. 5 (Case 4).—Periapical abscess of maxillary lateral incisor, treated by periapical curettage, and showing complete regeneration of bone.

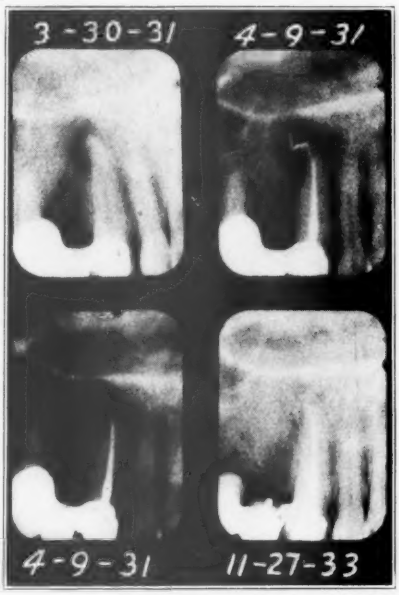

Fig. 6 (Case 5).—Chronic periapical abscess of maxillary cuspid, treated by periapical curettage and showing complete regeneration of bone.

4. Then the canal is opened through the crown of the tooth and cleared of its contents.

5. The surgical periapical opening is packed with gauze in order to seal the foramen temporarily. It is evident that it is a simple matter to clear and dry the

canal for the reason that there can be no seepage into the canal with the foramen packed off by the gauze.

6. The canal is treated by any means in use, dried with alcohol and filled with the usual canal filling, preferably through the foramen.

7. The gauze packing in the surgical opening is removed and again the excess canal filling is removed gently and the cavity carefully curetted.

The treatment of teeth with cystic involvement is different only in the following respects:

1. With the enucleation of the cyst, the apex is amputated, just below the membrane attachment.

2. With the conservative Partsch operation, the apex is not necessarily amputated, for the reason that the inner membrane of the cyst is left in the cavity and the cavity is packed.

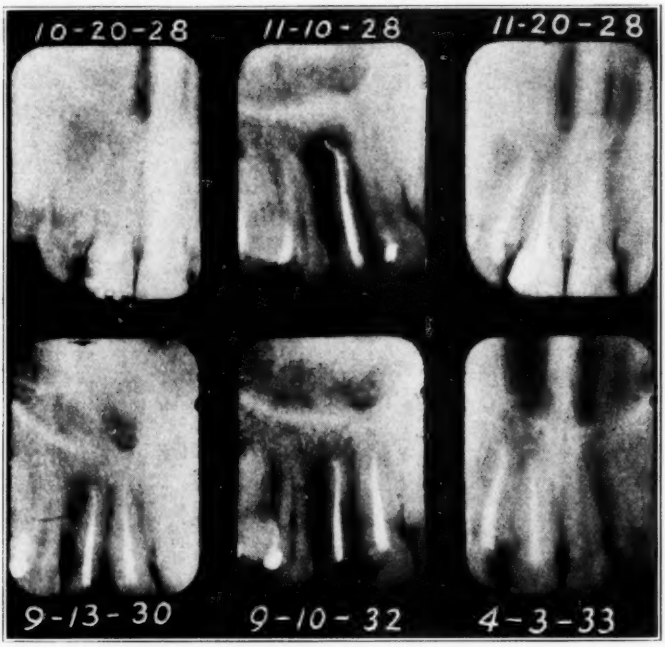

Fig. 7 (Case 6).—Chronic periapical abscess of maxillary lateral incisor, treated by periapical curettage and showing complete filling in of new bone.

8. The apex is then treated with silver nitrate.

9. The surgical cavity is swabbed with iodine, the retractor removed and the patient dismissed without suturing; or the surgical cavity can be packed with iodoform gauze, if it is desired.

REPORT OF CASES

CASE 1.—J. G., aged 13, presented a condition diagnosed as radicular cyst of the upper lateral incisor. Under procaine anesthesia, the conservative Partsch operation for cysts was performed. The canal was treated and filled at the same sitting.

There was no resultant deformity. The

teeth assumed the normal anatomic position after elimination of the cyst. (Fig. 2.)

Case 2.—Mr. E. D., aged 25, had been confined to bed suffering from acute jaundice for nine weeks without relief, at the end of which time he complained of pain in the right jaw. He was referred to me for examination.

On examination, a radicular cyst of the right mandibular first and second molars, and another of the right mandibular third molar were revealed.

Under procaine anesthesia, the conservative Partsch operation for cysts was performed and the second and third molars were extracted. Attempt was made to save the first molar, as it responded positively to the pulp tester. Some time later, as will be noted from the dates, this first molar became pulpless. It was then treated and the canals were filled. At a still later date, the second bicuspid became involved, probably from the old deep amalgam filling and had to be treated and filled; with the result as shown.

I am not quite ready to offer any positive treatment for periapically involved multirooted teeth and therefore advised the extraction of all three molars. The first molar was treated only on the request of the physician referring the case. The result is, you will agree, quite satisfactory. The jaundice cleared up immediately after the operation.

Fig. 8 (Case 7).—Chronic abscess of maxillary central incisor, treated by periapical curettage and showing complete filling in of new bone.

Fig. 9 (Case 8).—Chronic abscess of central and lateral incisors, treated by root amputation and showing complete regeneration of bone.

No deformity resulted.

Case 3.—Mrs. J. J. B., aged 32, presented a radicular cyst (residual). Under procaine anesthesia, the palatal mucosa was reflected and the cyst enucleated. The flap was replaced and sutured.

This was undoubtedly a residual cyst, the maxillary lateral having been extracted

about two years previously. Since then, swelling has appeared on the palate several times. It was incised at each presentation, only to reappear.

No deformity resulted.

CASE 4.—Miss H. McA., aged 24, presented a chronic periapical abscess of the right upper lateral incisor. Under procaine anesthesia, a surgical opening of the periapical area was made, with treating and filling of the canal and curettage of the periapical area at the same sitting. The wound was left open to granulate.

CASE 5.—Mr. A. K. F., aged 32, presented a chronic periapical abscess of the right upper cuspid. Under procaine anesthesia, surgical opening was made of the periapical area, with filling of the root canal and curettage of the periapical area at the same sitting. The wound was packed with iodoform gauze.

CASE 6.—Miss E. G., aged 17, had a chronic periapical abscess of the right upper lateral incisor. Treatment was the same as in Case 7.

CASE 7.—Miss L. B., aged 16, had a chronic periapical abscess of the right upper central incisor. Under procaine anesthesia, surgical opening was made of the periapical area, with filling of the root canal and amputation of the root. The wound was sutured.

CASE 8.—Mr. F. F., aged 38, had a chronic periapical abscess of the right upper lateral incisor and also of the left upper central incisor. Treatment was the same as in Case 9.

CONCLUSION

If we can arrive at such results with complete regeneration of bone around these periapically involved teeth, without extraction or without root amputation of involved teeth, is it not desirable?

The problem of the remaining two classes as first outlined, namely, multirooted teeth that for some reason or other must be devitalized and multirooted pulpless teeth (putrescent, abscessed or with cystic degeneration) that require root canal therapy, I have discussed in a paper entitled "Pulp Amputation—A Means of Preventing Periapical Pathosis."[5]

311 Commonwealth Avenue.

5. Levine, J. H.: D. Cosmos, 75:970 (Sept.) 1934.

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Editorials

AGRANULOCYTOSIS

Agranulocytosis threatens to become a serious menace to the welfare of the people. Not that it is at present so widespread or that there is such a pronounced susceptibility apparent in its manifestations, but that it has been up to this time so baffling as to its causes and so fatal in its results.

A classic paper on the subject by Paul J. Hanzlik, M.D., of the Stanford University School of Medicine, and member of the Council on Dental Therapeutics, appeared in the March issue of THE JOURNAL, page 487, and we recommend it for a careful reading by our members.

As the author says, it is a comparatively new disease, having been first described only twelve years ago. It seems to be one of the ironical experiences of our common humanity that as often as one disease is subdued and under control, a new affliction manifests itself to prove a threat against our well-being. In view of the fact that agranulocytosis usually shows itself in the mouth early in the dis-

ease, the dental profession should be alert in studying its manifestations and recognizing its appearance.

Hanzlik records the symptoms as follows: "Lassitude, sudden onset of fever, chills malaise, prostration and sore throat in the early stages; ulceration and gangrene of the tonsils, tongue, gums and buccal membranes, which spread rapidly and may be confused with Vincent's infection."

The moment a dentist encounters these symptoms, he should refer his patient to a competent oral surgeon. There should be no procrastination or vacillation when symptoms like these occur. In view of the fact that there has been in recent years such a widespread prevalence of Vincent's disease, the unobservant practitioner may easily be lulled to sleep by the supposition that his patient is merely suffering from this infection, and golden moments may be lost which might decide the issue between life and death. This is a disease that cannot be trifled with.

The treatment of these cases has not up to this time progressed with sufficient simplicity or definiteness to warrant the average dental practitioner in attempting its management. Even the physician or skilled oral surgeon is not sufficiently certain of his ground to warrant an undue optimism in handling this ailment, and it is folly for the general practitioner of dentistry to trifle with such a serious affection. But there is one thing he can do: he can make himself sufficiently familiar with the symptoms to be able to recognize the condition and call for help at once.

In view of the gravity of this disease, the entire profession should be on the alert, and watch for its earliest manifestations. If this attitude becomes general, the profession will at least absolve itself of any charge of dereliction of duty in the presence of this increasingly prevalent malady.

While we do not know the cause of the disease, it may be considered significant that most of the cases reported to date have been in people addicted to taking large amounts of drugs, particularly the amidopyrine group. As Hanzlik points out, care should be had about prescribing these drugs without first being assured that the patient is not especially susceptible to them. And this brings up the oft-repeated injunction against the careless and general use of drugs

administered for the purpose of allaying pain or discomfort without a knowledge of their possible deleterious effects. The dentist should be very cautious about recommending drugs to patients that may either do harm or prove habit-forming. Anything that leads to self-medication is dangerous, and the dentist should warn his patients against it.

Of a total of forty-five references appended to Dr. Hanzlik's article, all except five were published in 1934; which indicates a very active and relatively recent interest in the subject. Our research men must lose no time in running this disease to earth, and bringing it within the purview of the professions, and meanwhile the rank and file should exhibit alertness in acquainting themselves sufficiently with the symptoms to be able to recognize them the moment they appear. To do less than this is to lay ourselves open to the charge that we are remiss in our duty to the public that we are supposed to serve.

THE PACIFIC COAST DENTAL CONFERENCE

Something is happening on the Pacific Coast this year that will bear watching. They are conducting a meeting in July that promises to be a little bit different from the ordinary meeting, and a little bit better. They are laying out their program along unique lines. The aim is to develop each section from the fundamentals of the subject to the latest developments in theory and technic. In certain respects, it will be the most orderly presentation of the various topics that has ever been offered the profession. In other words, the idea is to systematize dental theory and practice in such a manner that the men and women who attend the Conference can take away something of concrete benefit from the meeting, something that will tie in with their every day needs and desires.

This meeting is not designed to present an unorganized hodgepodge of papers tossed together promiscuously, and intended merely for the exploitation of the author's pet ideas: it is intended as a serious effort to promote in a systematized way the latest and best in dental thought. It is hoped that it may prove a fitting sequel to the

excellent work done at the previous Pacific Coast Dental Conferences, with the added advantage afforded by time and experience. These two conferences registered a distinct advance in dental association effort, and too great credit cannot be given to all of those who were in any way instrumental in organizing and launching them. As is the case with the officers and committees of the present meeting, the first and second conferences brought forth the best and most progressive men in dentistry.

These meetings are proving of the greatest possible benefit not only to the dentists of the Coast but also to the profession of the entire country. The American Dental Association is inseparably bound up in them, even to the extent that the Conference will not accept a member unless he has membership in the A.D.A.

We look for this Conference to prove of the greatest possible benefit to the New Orleans meeting in November. Everything unique and outstanding in the Conference in July, everything new and worth while, can be relayed to the meeting in November for the benefit of those who on account of distance could not attend the meeting in Long Beach.

This community of interest will prove of the greatest possible benefit to all concerned. The wide expanse of our country with its geographic land-marks makes it necessary to recognize the demands of the different sections. The geographic semi-isolation of the great Pacific Coast with its nearly 15,000 dentists renders it incumbent on the profession as a whole to lend a sympathetic ear to its needs, and by the same token we must not forget the obligation of the American Dental Association to hold its meeting on the Coast at suitable intervals. These fine men located west of the great mountain ranges are putting up a valiant fight for the uplift of the profession. They have sacrificed much for the general good, and have journeyed frequently, willingly and in large numbers to the midwest and the east to attend meetings, especially those of the American Dental Association, as well as to other national bodies, and it is only fair that they be shown reciprocal favors by the men of other sections when they put on one of their Coast Conferences. A visit to the coming Conference will prove a revelation in what is being provided in dental association effort. July 8, 9, 10, 11, 12, 13, 1935, are the dates.

A PERSISTENT MISCONCEPTION ABOUT HUNTER AND THE SUBJECT OF FOCAL INFECTION

One of the strangest and most persistent misconceptions that has ever occurred in dental literature relates to the impression made on medical men and dentists by the pronouncement of Dr. William Hunter of London, England, in connection with the subject of oral sepsis and focal infection. Before we go to the main issue, it may be well to note the fact that there were two William Hunters in England: Sir William Hunter, who was born in 1840 and died in 1900, and Dr. William Hunter, who was born in 1861, and who wrote the article on oral sepsis. All through our literature, we see various references to Sir William Hunter as the author of the oral sepsis theory, when, as a matter of fact, it is not on record that he referred to it at all.

The facts are these: Oct. 1, 1910, Dr. Hunter delivered an address at the opening session of the Faculty of McGill University of Montreal, which was published in the London *Lancet* of Jan. 14, 1911. In this address, he took the dental profession severely to task, particularly "so-called American dentistry," as being instrumental in bringing about the kind of sepsis of which he was complaining. This referred of course to the construction of artificial substitutes for lost natural teeth such as bridges or partial dentures, and it is eminently on record that long before Hunter spoke, many thoughtful men in our own profession had deplored some of the artificial work that had been placed in the mouths of patients, and had loudly declaimed against it.

It was therefore felt to be unfortunate at the time that Dr. Hunter should have singled out American dentistry for his major attack. This for two reasons: The almost universal effort on the part of the leading men of England and America to establish an *entente cordiale* between the two countries, particularly in professional matters; and the fact that, in the very nature of things, Hunter was hardly qualified to pass judgment on American dentistry when he was almost wholly unfamiliar with its better and most approved practice. This was decisively shown by the recital of his cases, not one of which could by the widest stretch of the imagination have

been attributed to the average American dentist or, as a matter of fact, to an American dentist at all.

Doubtless the cases referred to by Dr. Hunter were either mostly those from the Charing Cross Hospital or the London Fever Hospital, in both of which he was attending physician; or they came from that unspeakable class of practitioners represented by the dental parlors of London, who heralded the misleading name of "American Dentists" as their stock in trade. To prove that this is far from a case of the "pot calling the kettle black," we should like to emphasize the fact that the better element of American dentists are as thoroughly ashamed of the dental parlor type of practitioner as Dr. Hunter or any of the other fine men who represent British medicine or dentistry can possibly be.

Without question, there are men in both countries who carry a smudge of disrepute about them, but they should not be held as representative of the profession in either country; nor should the whole profession be labeled black in consequence.

But all of this is merely incidental to the main contention at this time, which is to the effect that there has persisted a wholly unaccountable misconception in connection with the application of Hunter's findings. The "oral sepsis" of which he complains—and not without reason—had nothing whatever to do with the thing that, during the decade that followed his address, caused the greatest concern among the profession; i.e., focal infection from the apical ends of pulpless teeth. This is the thing that has claimed our major consideration, and in connection therewith the name of Hunter has repeatedly been quoted. As a matter of fact, Hunter never referred in the remotest way to the evils of pulpless teeth as such. He was concerned with the sepsis that came from accumulations around crowns, bridges and artificial dentures, calling them "gold traps of sepsis." His cure was to swab around such appliances with antiseptic washes, etc., and to clean out the débris, and remove the deposits, a wholly praiseworthy procedure as far as it went, but almost totally inadequate when it comes to eliminating the possibility of systemic infection in the blood stream.

Hunter did a notable work in forcefully calling attention to the evils of oral sepsis, and it is well that his words left a deep impres-

sion; but he should no longer be credited with initiating the campaign against pulpless teeth, because he did not do it. Mayhap if this distinguished scientist had given his whole-hearted attention to this important question, the mental aberration and almost universal prejudice against the pulpless tooth that has developed might have thereby to a certain degree been avoided. Possibly if Hunter had spoken at that time, the attitude of the medical and dental professions would have been modified, and the members might have reacted to a slightly paler tinge of red whenever the name of the pulpless tooth was mentioned.

DENTAL WRITING

The theme of this paper is the quantity and method of dental writing and not the grammar and rhetoric of it. The sensitiveness that is always associated with writing is ignored. Individuality, personality is not considered. Just the fact of the increasing quantity stated as something needing thoughtful attention. That is all.

Looking at the heap of bound paper that comes from the presses monthly, questions naturally obtrude. Where does it come from? That we know. Where does it go? How is it cared for? How much of it is worth keeping? Must it all be kept? Who pays for it and the cost of its storage? How will the next generation of workers cope with it? Answers to these questions do not come so easily. Won't writers, editors or librarians have to warn of a glut, a waste level at a near future? Is there no way that this pile may be reduced, kept within bounds and still kept useful?

One may explain how this situation has arisen. The popularity of research, of meetings, of seeing one's brain children in the show window of the print-gallery. The aspiration of bulletins to become journals, of journals to become bigger journals. Journals are created to catch the overflow and the overflow runs from perpetual springs. So journalism has developed.

This is not fault-finding. It is the presentation of what promises to become a terrific burden. The profession is repeating what has happened in general literature. Writing has become as popular as

was piano playing a generation ago. That instrument was the big bad wolf of childhood and the *bête noir* of visiting friends in every home. Now it is writing. The result is authors seeking the autographs of buyers, instead of the buyer seeking the signature of the writer. To read profitably, one must read nothing less than 10 years old. If one would emphasize a difference, one should stress the fact that the literature in question is professional, is scientific, ought to have a yardstick of evaluation, be analyzed and appraised for the sake of workers to come, for the sake of wider spread enlightenment of those who would keep to date, in the interest of the issues that burn at the center of professional purpose.

This treatise is neither criticism nor slander of useful, effective publication. Rather it is a call for effective publication for greater usefulness. It is not a denial of outlet for what writers themselves deem worthy, but a plea for greater care in what they let out. It is supportable to say that half of the articles printed could be reduced by half. Likewise it is true that results of years of laborious observation are buried in the débris of a promiscuous paper shower. Libraries become vast wastepaper receptacles into which go treasure and trifle together. The index is a futile chesterfieldian attempt at rescue. It helps, is useful, is indispensable, but with the required article in hand the gist is still far from sight. The axe should be laid to the root of the tree and that is at the point of origin.

The abstract comes with a flicker of aid, but no attempt to help is made with any system or thoroughness. And, oddly, no demand has ever been made for it. Writers have been asked to append abstracts, have refused, and that despite the fact that no man can abstract a paper so well as the man who wrote it. The papers that cannot be abstracted may be ignored. They fall into another category.

Observe, compare, reflect, record has been followed with the emphasis on record. Observation and comparison have been widely superficial. Reflection has been brief. The recording has outrun usefulness. The proof is in every library. It is evident that the task of culling has been left to editors, and they have not the immunity of the Supreme Court. The job implied here is primarily the worker's and not the editor's. The student sallying abroad with a

pearl of information rescued from the depths by long, troublesome and tiring effort has given no thought as to how it should be preserved. He lets it be buried or buries it himself a second time at depressing depths, indifferent to its accessibility, as though he were not responsible beyond finding it. The findings of today are the stepping stones of tomorrow. As those stones are now set, the laborers of the future will be over their shoetops most of the time and frequently bogged.

The retort will be, "We are no worse than medicine." The reply is, "Why be as bad?" Medicine has set us an example of what not to follow in many ways. Likewise, we have not been finical in not following where medicine has wisely led. The same intelligence that unearths information should be applied to its disclosure. Instead, that intelligence has left the matter to others: owners, editors, opportunists and promoters, whose primary interest is elsewhere. The editors, to be sure, should be cooperative in this purpose and could with small assertiveness and slight diplomacy better the conditions. They know the recurrence of old material pirated from the originators without the excuse of improved garb, published merely to gild a name.

The many corollaries and postulates that come to mind in reading this essay are avoided for the sake of brevity, difficult as that has been to do. The motive of it is wholly the collation of good material within smaller compass, to make the facts and phenomena of research more readily visible, to delete the inflations and overstuff that hide them and to ease the path of future workers for speedier progress. The scientist himself must assert and defend the difference between the scientist and the research worker. He must come to his own rescue from interment under barrows of pointless repetitive writing of the mere research worker. He must demand a better concentration of publication of what science produces.

T.

PRACTICE IN PARAGRAPHS

This department is intended for busy readers. It aims to tell a vivid story in a few words. Items should be of a practical character, and free from padding—not more than a paragraph or two. We exact no limit, but two hundred words can tell most of these stories. Send in your ideas; they will be welcome.

Heating Anesthetic Solution—Holding the syringe containing the anesthetic solution under the hot water faucet for a few seconds before making the injection heats the solution to blood temperature and lessens shock and trauma.—*William F. Taylor, Muskogee, Okla.*

Sensitive Dentin—Isolate the field of operation with rubber dam. Dip pellet of cotton in carbolic acid, and hold over an alcohol flame until acid fries. Bathe the cavity with this. Repeat when sensitive dentin is reached. Cavities treated in this manner give comparatively no pain.—*H. C. Heyen, Emmetsburg, Iowa.*

Instrument for Applying Topical Anesthesia—Screw a contra-angle mandrel on a rubber cleaning cup and tighten the mandrel in a porte polisher. A small pledget of cotton dipped in the anesthetic and placed in the rubber cup may be easily carried to, and pressed on, the gum surface to be anesthetized, by this instrument.—*F. D. Voigt, Salem, Ore.*

Use of Sandpaper Disk in Trimming—A simple and fast method of trimming down wax impressions of inlays and three-quarter crowns after removing the matrix is to use a coarse sandpaper disk on the engine. It has an advantage over the use of an instrument in that it shapes the margins so that less finishing is needed. A finer disk may be used for a smooth finish.—*J. R. Keane, Los Angeles, Calif.*

Camphophenique Powder as an Aid in Filling Root Canals—Dentists who are using a varnish and guttapercha point for canal filling will find camphophenique powder an aid in preventing the material sticking to the packing instruments. The instruments should be repeatedly dipped into the powder during the packing operation. This will prevent the accident of withdrawing the canal point after it has been partially packed to place.—*W. Clyde Davis, Lincoln, Nebr.*

Amalgam vs. Gold Foil—Gold foil is not a competitor with amalgam nor with any other filling material. It is, rather, an invaluable adjunct to them all. Gold foil is a competitor only with "Father Time." So much has been said and written regarding the unusual care necessary in handling gold foil that many dentists are actu-

ally afraid of it. They cannot conceive how it fits in with their office procedure. As a matter of fact, being elemental in nature, gold foil will tolerate as much or even more abuse than amalgam with its varying content of mercury and the carelessness of its trituration.—*H. E. Williams, Red Bank, N. J.*

Hobbies—Golf, tennis, hunting, fishing, boating, music and art are all legitimate hobbies. A hobby of some kind is essential as a mental and physical stabilizer, but hobbies are detrimental when they overshadow one's source of livelihood. The logical hobby for the dentist is dentistry. If America's 68,000 dentists should at once begin research, investigation and experimentation on the various filling materials alone, rather than stressing the shortcomings of them, the great dental profession of today would become the greatest profession of tomorrow. Let us enjoy all of our hobbies a little, but develop our dental hobby more.—*Herbert Ely Williams, Red Bank, N. J.*

Overtime Vs. Undertime—The word "overtime" is antagonistic to the majority of dental practitioners. The hour of 5—the low water mark—is indicative of a day of effort expended and done. Complaint is prevalent of the effects of the depression, and, at the same time, overtime sounds a discordant note. When regular office hours are unfilled, it is no disgrace, nor a reflection on a profession, to see patients at their convenience. Anytime is said to be no time, but anytime, especially when a younger dentist can add to a competency, is a good time. The proceeds of overtime should be recognized as a separate fund and invested in a separate savings department in a bank that will stay open. These proceeds should have no part in the 9 to 5 endeavors. The proceeds of overtime, judicially and safely invested, might exceed by far the saving of a lifetime dental career of regular hours and indifferent thrift. —*Herbert Ely Williams, Red Bank, N. J.*

Brushing Baby's Teeth—It is usually thought impossible, or a ridiculous idea, that a child of 18 months should brush its own teeth, but it can be done. It is a well-known fact that children are great imitators and in this fact lies the secret of teaching the child at a very early age to brush its teeth. In this particular case, the little one has a dressing table in the bath room, which the mother has found indispensable since birth. It is part of the morning ritual for the little girl to sit on her table and watch her parents go through the usual preparations for getting down to breakfast. At 15 months, she was supplied with a tiny brush, more to aid the teething process than for anything else. It was not long thereafter that she became very interested in watching her parents brush their teeth and, quite of her own accord, she started to imitate the performance. Then a tiny bit of tooth paste or powder was applied to the brush to stimulate interest and now a glass containing a little bit of water is added to the armamentarium. It is interesting to note how well a child of this age does the job, not by being instructed and taught how to do it, the usual procedure, but rather merely by observation. Not a morning passes now but that the child insists on repeating the process at the same time her parents do.—*R. N. Douglas, Elkhart, Ind.*

COUNCIL ON DENTAL THERAPEUTICS

AZOCHLORAMID

The Council has authorized publication of the following article on Azochloramid, acceptance of which is announced elsewhere in this issue.

SAMUEL M. GORDON, *Secretary.*

Chlorine-liberating compounds have been used in medicine and dentistry for many years. The first chlorine-liberating preparation to obtain a degree of popularity was the present solution of chlorinated soda, or Labarraque's solution, now official in the present edition of the pharmacopeia. In time, modifications of the solution appeared in the literature, the best known probably being surgical solution of chlorinated soda, U.S.P., popularly known as modified Dakin's solution.

There followed later the introduction of organic compounds which liberated chlorine, the first being chloramine-T, U.S.P., which was followed by dichloramine-T, U.S.P. The advantages of the organic chlorine-liberating compounds lay in their ability to liberate chlorine, at the same time being less irritating to the tissue than the inorganic hypochlorite preparations. Dichloramine-T has found wide usefulness in dental therapeutics as an antiseptic for infected wounds. Dissolved in an inert medium, such as heavy paraffin oil or chlorinated paraffin, U.S.P., it has been employed widely in the treatment of infected root canals, and acute suppurative conditions of the periodontal membranes.

Wallace and Tiernan Products, Inc., Belleville, N. J., presented Azochloramid for the consideration of the Council, with the appreciation that its possible usefulness in dental therapeutics had not been completely surveyed, but, before introducing the product to the dental profession, it desired to be guided by the Council. Preliminary experiments in treating infected root canals indicated its usefulness in that respect.

CHEMISTRY

Azochloramid is a hitherto unknown compound N-N-dichloroazodicarbonamidine. It possesses the following chemical structure: $NH_2.(NCl):C.N:N.C:(NCl).NH_2$. It will be noted from the structural formula that Azochloramid has essentially the same grouping; namely, a chlorine attached to a nitrogen atom as in chloramine-T and dichloramine-T. It differs from most other well-known chlorine liberating compounds by being almost odorless, and reacting only with the most active reducing agents, such as sulphur dioxide and hydrogen sulphide. It would follow that the chlorine of the molecule is not so readily given up as that in hypochlorite or chloramine-T. This is seen by comparing amounts of these products reduced if 200 parts per million are incubated with 100 parts per million egg albumen. After twenty-four hours, it is found that the following quantities of chlorine still remain available in the solution[1]:

Hypochlorite	Chloramine-T	Azochloramid
5	123	189

It also differs from other chlorine liberating compounds in being less soluble. Its solubility in readily available solvents is:

1. Guiteras, A. F. and Schmelkes, F. C.: The Comparative Action of Sodium Hypochlorite, Chloramine-T, and Azochloramid on Organic Substrates, J. Biol. Chem., 107:235 (Oct.) 1934.

Water	0.03 per cent
Ethyl alcohol	1.24 per cent
Ethylene glycol	1.26 per cent
Acetone	4.20 per cent
Ethyl acetate	1.10 per cent
Benzene	0.05 per cent

It is also soluble in most vegetable oils, but insoluble in chloroform, carbon tetrachloride, petroleum ether and hydrocarbons of a similar nature. None of these solutions are stable. A solution in poppy seed oil, a now abandoned medicament, decomposes at the rate of approximately 10 per cent per month. This would indicate the necessity of using solutions prepared at or near the time of using. In this respect, that medicament is similar to dichloramine-T in chlorinated paraffin. In order to obviate this difficulty, solutions of triacetin which are practically stable are being marketed.

BACTERIOLOGY

Various chlorine-liberating solutions have been in use in the treatment of root canals. It is advantageous, in the treatment of root canals, to use an agent that will liberate chlorine slowly. The slowness with which the chlorine is liberated reduces the possibility of irritation and enhances the period of time that the agent is germicidal. Frequently, blood or blood serum is present in root canals, and although evidence has been submitted that the efficiency is slightly reduced in the presence of blood serum, there seems to be justification for the assertion that it is more efficient than other chlorine-liberating solutions under this condition. Additional investigations, as regards the effect of blood as well as that of serum, of the efficiency of chlorine-liberating solutions might be of value.

CLINICAL APPLICATION

Case reports from four dentists were submitted. One set of case reports was frankly of little use in evaluating the usefulness of the product, because the treatment was accompanied by no controls. Another series of case reports, made by H. J. Ross, of New York City, was submitted by the firm. Dr. Ross' series included sixty-three cases of root-canal therapy with azochloramid. The methods used by Dr. Ross were the usual ones of root canal therapy, but care was taken to secure access to the canals by mechanical rather than by chemical means. The teeth were cultured at the first sitting, and flushed with an aqueous solution of azochloramid and paper points dipped in saturated azochloramid solution and then sealed.

Of these cases, practically all gave positive cultures on opening the canal, and negative cultures after the second or third treatment. When the cultures were negative, the roots were sealed. Forty of these cases were diagnosed either as acute suppurative pulpitis or as chronic ulcerative pulpitis.

The referee undertook a series of experiments in his clinic with the following results: Twelve cases of necrotic and gangrenous pulps were treated. The results were comparable to those reported by H. J. Ross. The canals were opened by mechanical methods only. Negative results were not obtained quite so rapidly as in the tests of Dr. Ross; which may be due to the fact that the method of treatment was a little more conservative in that, on opening of the canal, one dressing of azochloramid was placed before any attempt was made to remove necrotic material. The clinical results obtained were as rapid and as definite as with other recognized methods of treatment.

Louis I. Grossman, of Philadelphia, reported thirty cases treated with azochloramid. His results were comparable to those reported by Dr. Ross. Negative cultures were obtained on the second, third and fourth treatments. No case required more than four treatments.

CONCLUSION

The data submitted by the firm, and the results obtained in the referee's laboratory and by others, indicate that azochloramid may have a field of usefulness as a slow-liberating chlorine compound, for the treatment of infected pulp canals. A description of the product appears elsewhere in this issue.

ACCEPTED DENTAL REMEDIES

The following articles have been accepted as conforming to the rules of the Council on Dental Therapeutics of the American Dental Association. The Council desires dentists to understand that the admission of an article does not imply a recommendation. A copy of the rules which govern the Council in the consideration of articles will be sent on request.

SAMUEL M. GORDON, *Secretary*

HYPOCHLORITES AND HYPOCHLORITE SUBSTANCES[1]

Chloramine Preparations

Azochloramid. — N-N'dichloroazodicarbonamidine — $NH_2.(NCl):C.N:N.C:(NCl)NH_2$. Azochloramid contains 38.8 per cent active chlorine.

PROPERTIES: Azochloramid occurs as yellow needles. It is odorless and tasteless. It is soluble in water, lipoids, and most organic solvents; it is insoluble in aliphatic saturated hydrocarbons. It decomposes at 155.5 C. It is unstable in solution of oils and fats, the rate of decomposition being accelerated by light. Solutions in triacetin are practically stable.

ACTIONS AND USES: Azochloramid represents a stable chlorine-liberating compound. The available chlorine is liberated slowly in contrast to other chlorine-liberating compounds. It is said to be an effective germicide in the presence of pus, serum and organic matter.

In the presence of 50 per cent serum, 25 parts per million azochloramid kills *B. coli* in one hour, a pneumococcus Type I in one and one-half hours, Type II in one hour, and Type III in three hours; 30 parts per million kills *Staphylococcus aureus* in thirty minutes.

In the therapeutic doses given below, it has been found to be nontoxic and nonirritating. It is suggested for use in the sterilization of dental pulp canals and periapical abscesses, in the treatment of fistulas and as a wet dressing for infected wounds. One observer has reported that it colors teeth slightly, but this may be circumvented by the application of a varnish to the crown of the tooth before the medicament is sealed in the root canal. It is ineffective when administered internally or intravenously.

DOSAGE: For root-canal therapy, azochloramid in triacetin 1:100 and azochloramid paper points are used. For dressing and packing wounds, it is used in triacetin solution 1:500.

Manufactured by Wallace and Tiernan Products, Inc., Belleville, N. J. United States Patents No. 1,958,370 (May 8, 1934; expires 1951), and 1,958,371 (May 8, 1934; expires 1951). U. S. trademark 322,242.

N-N-dichloroazodicarbonamidine was first prepared by F. C. Schmelkes and H. C. Marks (*J. Am. Chem. Soc.*, 56:160 [July] 1934) under the name "azochloramid."

About 0.100 gm. of azochloramid accurately weighed is dissolved in 25 c.c. of acetone. One gram of potassium iodide and 50 c.c. of water are added. The mixture is acidified with 5 c.c. of glacial acetic acid and titrated with 0.1 normal sodium thiosulphate solution, with

1. Accepted Dental Remedies, 1934, p. 112.

starch as an indicator. A further volume of 100 c.c. of water is added just before the end point is reached. The chlorine content of azochloramid should be not less than 38 per cent, obtained by the following calculation:

$$\left[\frac{\text{c.c. 0.1 N } Na_2S_2O_3 \times 0.001773 \times 100}{\text{Weight of azochloramid used}}\right] \times \tfrac{2}{3}$$

The theoretical chlorine content of pure azochloramid is 38.8 per cent.

COD LIVER OIL AND RELATED SUBSTANCES[2]

Ucoline Cod Liver Oil Concentrate.—The unsaponifiable fraction of cod liver oil, prepared by the Marcus process, dissolved in a bland vegetable oil. Each gram of the solution contains 5,500 U.S.P. X (1925) units of vitamin A and 1,800 A.D.M.A. units of vitamin D (according to the U.S.P. X Revised, 1934, 7,700 units of vitamin A and 552 units of vitamin D).

ACTIONS AND USES: Ucoline Cod Liver Oil Concentrate possesses properties similar to those of cod liver oil so far as these depend on the fat soluble vitamin content of the latter.

DOSAGE: From 3 to 6 drops of the concentrate solution three times daily (a glass dropper is included in the marketed package, designed to deliver one minim per drop); for the tablets, 1 to 2, three times daily.

Manufactured by the Ucoline Products Company, Chicago, under U. S. patent 1,690,091 (Oct. 30, 1928, expires 1945). No U. S. trademark.

Ucoline Cod Liver Oil Concentrate Tablets.—Each sugar coated tablet contains 0.02 gm. of the dry concentrate. They are assayed to contain in each tablet not less than 1,000 U.S.P. X (1925) units of vitamin A and not less than 500 A.D.M.A. units of vitamin D (according to the U.S.P. X Revised, 1934, 1,400 units of vitamin A and 153 units of vitamin D). This represents 1,790 U.S.P. X (1925) units of vitamin A (2,506 U.S.P. X, Revised, 1934) and 895 A.D.M.A. units of vitamin D, (276 U.S.P. X Revised, 1934) per gram of tablet.

DENTIFRICES[3]

McCann's Tooth Powder: Composition: Each 100 parts is stated to contain: sodium chloride, 36 gm.; sodium sulphate (anhydrous) 5 gm.; sodium bicarbonate, 13 gm.; sodium carbonate (monohydrate), 3 gm.; sodium borate, 13 gm.; dicalcium phosphate (Victor), 30 gm., and oil of wintergreen, 1 gm.

Claims: McCann's Tooth Powder is sold as an aid to clean the surfaces of the teeth when used with a toothbrush.

Manufactured by Eli Lilly & Co., Indianapolis, Ind., distributed by McCann's Tooth Powder, Danville, Ill. No U. S. Patent. No U. S. trademark.

Ward's Tooth Powder[4]

Announcement of acceptance of Ward's Tooth Powder, Montgomery Ward, Chicago, Ill., was announced in the August,, 1934, isue of THE JOURNAL. This description appears in Accepted Dental Remedies, 1934.

Since that time, the firm has notified the Council of its desire to discontinue the marketing of the product of the foregoing composition under the name of Ward's Tooth Powder, and has submitted therefore a product listed in the description below:

Ward's Tooth Powder—Composition: Each 100 gm. is said to contain tricalcium phosphate (Victor) 25 gm.; cal-

2. Accepted Dental Remedies, 1934, p. 73.
3. Accepted Dental Remedies, 1934, p. 82.
4. Accepted Dental Remedies, 1934, p. 87.

cium carbonate (Sturge), 70 gm.; castile soap, 4 gm., and equal parts of methyl salicylate and oil of peppermint, 1 gm.

Claims: Ward's Tooth Powder is offered as a cleansing and polishing agent for the accessible surfaces of the teeth when used in conjunction with the toothbrush.

Distributed by Montgomery Ward, Chicago, Ill. No U. S. patent or trademark.

Revision of Rules for the Use of the Seal of the Council on Dental Therapeutics

Rule 4 of the Rules for the Use of the Seal of the Council has been revised to read as follows:

"The Seal is to be used without comment of its significance unless such comment has been previously approved by the Council. A statement proposed for such use follows: 'The Seal of acceptance denotes that (product named) and advertisements for it are acceptable to the Council on Dental Therapeutics of the American Dental Association.' The Council will not object to any statement which is wholly in accord with its own definition of the significance of the Seal. In all cases, the statement must be approved by the Council before it is used."

An Addition to the Explanatory Notes on the Rules of the Council on Dental Therapeutics

The Council has adopted the following general proviso as part of the explanatory notes on the Rules of the Council: "Firms manufacturing accepted basic products agree that the supplying of these products to manufacturers of trademarked dentifrices or other preparations used in dental practice shall be contingent upon the *observance* of an agreement by the manufacturers that the name of the American Dental Association shall not be used in *verbal* (including radio) or *printed* advertising to exploit dentifrices or preparations *unaccepted* by the Council on Dental Therapeutics of the American Dental Association."

VITA-CELL—NOT ACCEPTABLE FOR A.D.R.

The Council has authorized publication of the following report.

Samuel M. Gordon, *Secretary.*

Under the uninformative proprietary name "Vita-Cell," Godissart and Pyles, Hollywood, Calif., market a series of products: Vita-Cell—Surgical, Vita-Cell—Dental, Vita-Cell—Home Treatment, Vita-Cell—Dental Plastic, Vita-Cell—Ointment, Vita-Cell Soap. These products have not been submitted to the Council by the firm.

Many inquiries concerning the preparations have been received by the Council. An attempt was made to secure from the firm a statement of the qualitative and quantitative composition of the products, and evidence to support the broad claims made in advertising for the products, but the firm did not submit this information, although it was repeatedly requested to do so.

In addition to its advertising, "clinics" on the products have been conducted for groups of dentists.

Vita-Cell is said to be:

The result of years of research by the Medical Profession and chemists of Europe and more recently by dentists and physicians of the United States. A new principle of therapeutics has been evolved . . . the result . . . VITA-CELL!

Vita-Cell is said not to be intended as a cure-all, but on the following pages in an advertising pamphlet one reads:

VITA-CELL SURGICAL INDICATIONS

1. ACUTE WOUNDS.
2. CHRONIC WOUNDS with loss of tissue and considerable decay. DIABETIC and ARTERIO-SCLEROTIC GANGRENE ATONIC WOUNDS that have failed to cicatrize. FISTULAE, VARICOSE ULCERS, etc.
3. DERMATOLOGY. Practically all SKIN LESIONS, IMPETIGO, ATHLETES FOOT, PSORIASIS, ACNE, RINGWORM, etc., may be temporarily healed.
4. BURNS and SCALDS—all degrees.
5. ACUTE and CHRONIC EAR, NOSE and THROAT IRRITATIONS.
6. SURGERY, GYNECOLOGY, PROCTOCOLOGY, and UROLOGY.
7. DEODORIZATION.

Using VITA-CELL "DENTAL PROFESSIONAL" office treatment, the following results, among many others, are commonly obtained:

VINCENTS-PYORRHEA—Elimination of pus in two to five days' time in most cases.

DRY SOCKETS—Relief of pain generally within a half an hour, and the formation of normal blood clots in three to five days.

HYPERTROPHIC TISSUE—Reduced by topical application of VITA-CELL "DENTAL PROFESSIONAL," and prescribing VITA-CELL "DENTAL HOME TREATMENT," as directed on bottle.

FISTULA OF ACUTE ABSCESS—Elimination of pus with the reduction of the accompanying toxemia, by irrigation and topical application of VITA-CELL "DENTAL PROFESSIONAL."

TRISMUS—Reduced in most instances within thirty minutes, and pain controlled, by use of moist gauze dressing with VITA-CELL "DENTAL PROFESSIONAL" placed on, or near infection; for example, under third molar flap. If no abscess on apex of tooth or teeth.

SORE MOUTH caused by BURNS, HERPES, ULCERATIVE STOMATITIS, INFECTED TONSILS, and operative procedure, are relieved and healing is greatly stimulated by topical application of "DENTAL PROFESSIONAL," plus the prescribing of VITA-CELL "HOME TREATMENT" as a mouth rinse and gargle, as directed on bottle.

EXTRACTIONS—Promotes healing by stimulating granulation.

PYORRHEA SURGERY, PRE-OPERATIVE and POST-OPERATIVE—One or more topical applications of VITA-CELL "DENTAL PROFESSIONAL" relieves the edema and irritation incident to instrumentation.

EDEMATOUS CONDITIONS—Radical lance operation of the oral cavity in the majority of cases becomes no longer imperative because, due to the miscibility of VITA-CELL "DENTAL PROFESSIONAL" in serious exudates, stab lance technique to the seat of infection usually suffices to establish drainage for twenty-four hours. The exudates do not close the wound, and naturally resolution is consummated in correspondingly shorter time. VITA-CELL technique to be used in conjunction with the method of choice, as regards ice packs, compresses, etc.

DEODORANT—VITA-CELL will aid materially in deodorizing ONION, GARLIC, BEVERAGE BREATH, and other odors. Used effectively on ETHER MASKS in NASAL INHALATOR, SPRAY BOTTLE, PROPHYLAXIS, on CANSEROUS TISSUE, and in a glass of water at the chair as a mouth wash.

VITA-CELL IS NOT INTENDED AS A CURE-ALL. IT IS PRODUCED FOR THE DENTAL MEDICAL PROFESSION FOR CERTAIN PURPOSES. IT MUST BE APPLIED SO THAT IT REACHES THE SEAT OF INFECTION OR BURN.

While the firm refused to divulge the quantitative composition of the product, statements on the chemistry of the product appear in an advertising pamphlet. This need not be discussed in detail further than to call attention to the ridiculousness of many of the statements in that booklet under the "Positive" and "Negative" chemistry, whatever that may be. An ignorance of chemistry is betrayed by the writer of that part of the advertising. In any event, the reader is left uninformed as to just what Vita-Cell is. Experiments conducted in the A.D.A. Bureau of Chemistry indicate that Vita-Cell Dental Professional is a solution of essential oils with an odor of lavender predominating, in an aqueous medium of a rosin soap. Rosin soaps are not new. Sheep dip is a solution of

creosote in a rosin soap, and reference to the chemical literature reveals that essential oils dissolved in rosin soaps have been prepared and used for disinfecting purposes.

The Council cannot consider for acceptance a product of secret composition, since the Council holds that it is not only the right but also the duty of the dentist to be informed of the composition of a product that he is asked to use or recommend. It was pointed out above that the advertising stated that Vita-Cell is not intended as a cure-all. Nevertheless, the product is recommended for a host of conditions, from athlete's foot to venereal infections, with pyorrhea, Vincent's infection, trismus and hypertrophic tissue thrown in for good measure. No evidence in support of these claims appears in the medical or dental literature or in any of the letters of the firm sent to the Council. Therefore, the extensive therapeutic claims for the product may be said to be unsupported.

If Vita-Cell were "the result of years of research" which the firm's advertising asserts it to be, it is needless to point out that there would not be lacking in the medical or dental literature reports on its composition and probable therapeutic value.

The Vita-Cell Dental XX Home Treatment Package and circular are obviously directed to the general public, which is in direct conflict with the Council's rules. The Council has repeatedly pointed out the danger of indiscriminate reliance of the public on such preparations for all the conditions for which it is claimed to be of value, and also the danger to scientific dentistry of a reliance on such unwarranted claims.

Vita-Cell and the various forms parading under the name Vita-Cell are declared unacceptable for Accepted Dental Remedies because the preparations are of secret composition and marketed under a noninformative, proprietary name, with exaggerated and unwarranted therapeutic claims, in such a way as to lead to its ill-advised use by the public and to mislead the dental profession.

MORE MISBRANDED DENTAL NOSTRUMS

Radium Ointment.—Denver Radium Service, Denver, Col. Composition: potassium carbonate, isopropyl alcohol, quinine and volatile oils such as camphor, eucalyptol and menthol, soap, paraffin compounds, water, and a radioactive substance. The radium content was 13.4 millimicrograms per gram. Misbranding was alleged since the radium content was negligible. (Notice of Judgment 20351, issued December, 1933.)

Or-Aid.—Warner's Renowned Remedies Co., Minneapolis, Minn. Or-San Co., Minneapolis, Minn. Composition: zinc chloride, zinc sulphate, boric acid, and water, colored green and flavored with peppermint oil. Claims regarding treatment of pyorrhea, trench mouth, etc., were false and fraudulent. (Notice of Judgment 20352, issued December, 1933.)

Painallay.—Painallay Co., Kansas City, Mo. Composition: cresol (1 per cent), glycerin and saccharin and water (98 per cent). Claims regarding treatment of pyorrhea, trench mouth or Vincent's and all mouth and throat infections, were false and fraudulent. (Notices of Judgment 20356, 20359, issued December, 1933.)

Dr. Cates' Cato Tooth Paste.—Cato Chemical Co., St. Louis, Mo. Composition: calcium carbonate, potassium chlorate, a magnesium compound, talc and water, flavored with peppermint oil. Claims regarding antiseptic and germicide action were false and fraudulent. (Notice of Judgment 20357, issued December, 1933.)

McNess' Extract of Cod Liver Oil-Tonic.—Furst McNess Co., Freeport, Ill. Furst & Thomas Co., Freeport, Ill. Composition: calcium, sodium, iron, manganese, and potassium compounds, hypophosphites, alkaloids of nux vomica, quinine, malt extract, alcohol (17.3 per cent by volume), sugar and water. The article did not possess vitamin D

potency. Claims that it contained the properties of an extract of cod livers were false and fraudulent. (Notice of Judgment 20362, issued December, 1933.)

Pain Oil.—Furst-McNess Co., Freeport, Ill., Furst & Thomas Co., Freeport, Ill. Composition: volatile oils, including mustard oil, methyl salicylate, and eucalyptol, alcohol (60 per cent by volume), and water. Claims for treatment of toothache, etc., were false and fraudulent. (Notice of Judgment 20362, issued December, 1933.)

Menthoform.—Furst-McNess Co., Freeport, Ill., Furst & Thomas Co., Freeport, Ill. Composition: volatile oils, including cassia oil and menthol, formaldehyde, glycerin, alcohol and water, colored with a red dye. Claims for tender gums, bleeding gums, turgid gums, receding gums, pyorrhea, etc., were false and fraudulent. (Notice of Judgment 20362, issued December, 1933.)

Kemozene.—Select Drug Products Co., Brooklyn, N. Y. Composition: oxyquinoline sulphate (0.92 gm. per hundred milliliters) and water. Claims for treatment of inflamed or bleeding gums, etc., were false and fraudulent. (Notice of Judgment 20365, issued December, 1933.)[1]

King's Ceko Dental Paste.—C. G. King & Co., Inc., Providence, R. I. Composition: calcium carbonate, potassium chlorate, glycerin, potassium bicarbonate, volatile oils, including anise oil, menthol, and methyl salicylate, gum and water. Claims for treatment of the gums, including pyorrhea, were false and fraudulent. (Notice of Judgment 20377, issued December, 1933.)

Premo Aspirin Tablets.—Blackman & Blackman, New York City. Premo Laboratories, N. Y. Claims for treatment of toothache, and for use as an antiseptic gargle, etc., were false and fraudulent. (Notice of Judgment 20380, issued December, 1933.)

Arium.—Associated Radium Chemists, Inc., New York City. Composition: radium (2.6 millimicrograms per tablet) and strychnine. Claims for beneficial effects were false and fraudulent. (Notice of Judgment 20382, issued December, 1933.)

Pyro-Sana.—Alhosan Chemical Co., St. Louis, Mo. Composition: guaiacol, sugar, glycerin and water (approximately 97 per cent) colored with a red dye. Claims for treatment of mouth and gum infections, pyorrhea and trench mouth, etc., were false and fraudulent. (Notice of Judgment 20383, issued December, 1933.)

Salacephen Tablets.—Llewellyn Laboratories, Inc., Philadelphia, Pa. Composition: 1.687 grains of acetphenetidin. Claims that each tablet contained 2 grains of acetphenetidin were false and fraudulent. (Notice of Judgment 20394, issued December, 1933.)

Klinodento Tooth Paste.—The North American Co., Inc., Laboratories, New London, Conn., Drug Company, Puerto Rico, Inc., San Juan, P. R., New England Collapsible Tube Co., New London, Conn. Composition: magnesium hydrate and calcium carbonate in paste form, flavored with anise oil. Claims regarding development of oxygen in the mouth, for pyorrhea, preventing caries, etc., were false and fraudulent. (Notice of Judgment 20395, issued December, 1933.)

Lav-O-Din.—Lav-O-Din Co., Oakland, Calif. Composition: potassium iodide, sodium chloride, borax, glycerin, alcohol (7.9 per cent) and water, flavored with cassia oil and colored with a red dye. Claims for treatment of pyorrhea, trench mouth, spongy and bleeding gums, retarding tooth decay and receding gums were false and fraudulent. (Notice of Judgment 20552, issued February, 1934. See also Notices of Judgment 18928, issued June, 1932, and 19040, issued July, 1932.)

Aspirin Tablets.—American Pharmaceutical Co., Inc., New York City. Composition: approximately 5 grains each of acetylsalicylic acid. Claims for treatment of toothache and as an antiseptic gargle, etc., were false and fraudulent. (Notice of Judgment 20559, issued February, 1934.)

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1. See also Kemozone, Not Acceptable for A.D.R., Reports of the Council, J.A.D.A., 17:2303 (Dec.) 1930.

I. L. St. John's "Magnetic" Brand Oil.—Frank L. Bridinger, Tiffin, Ohio. Composition: small proportions of turpentine oil and rosin, chloroform, alcohol and water. Claims regarding toothache, etc., were false and fraudulent. (Notice of Judgment 20571, issued February, 1934.)

A. C. H. Ku-Rill.—A. C. Hynd Corporation, Buffalo, N. Y. Composition: sodium chloride, phenol, amyl acetate and acetone, alcohol and water, colored with a pink dye. Claims for use as a mouth wash and in treatment of sore mouth, canker, pyorrhea, etc., were false and fraudulent. (Notice of Judgment 20590, issued February, 1934.)

Dr. Pirtle's Germ-Oil—Germ-Oil Co., Jonestown, Miss. Composition: cottonseed oil, turpentine oil and sulphur. Claims regarding treatment of toothache, etc., were false and fraudulent. (Notice of Judgment 20591, issued February, 1934. See also Notice of Judgment 18325, issued January, 1932.)

Adium-Active Radium Ointment.—Adium Products, Inc., Battle Creek, Mich. Composition: petrolatum and powdered mineral matter. It contained a negligible trace of radium (less than 5 millimicrograms of radium per grain of article). Claims for radium therapy were false and fraudulent. (Notice of Judgment 20732, issued February, 1934.)

Vita Salve and Ol De Vita.—Bika Biochemical Laboratories, Philadelphia, Pa. Composition: Ol De Vita: essential oils, including peppermint oil. Vita salve: petrolatum, paraffin, and 21.4 per cent of volatile oils, including peppermint oil and methyl salicylate. Claims for treatment of toothache, etc., were false and fraudulent. (Notice of Judgment 20744, issued February, 1934.)

Veronica Water.—Veronica Mineral Springs Co., Chicago, Ill. Composition: mineral water containing epsom salt and other salts commonly found in ground water. Claims for curative or therapeutic effects were false and fraudulent. (Notice of Judgment 20747, issued February, 1934.)

Lav-O-Din.—Western Chemical Co., Hutchinson, Minn. Composition: potassium iodide, sodium chloride, carbonates, alcohol (7.8 per cent by volume) and water, flavored with cinnamon oil. Claims for pyorrhea, retarding tooth decay, trench mouth, bleeding gums, etc., were false and fraudulent. (Notice of Judgment 20876, issued June, 1934.)

I-den-tine Dental Cream, Dr. Wayne's Dental Cream, and Orident Dental Cream.—Trade Laboratories, Inc., Newark, N. J. Composition: calcium phosphate, calcium sulphate, gum, pepsin and an iodide, glycerin and water, flavored with peppermint oil. Claims for treatment of bleeding gums and pyorrhea were false and fraudulent. (Notice of Judgment 20878, issued June, 1934.)

Frigidine Tooth Paste.—Frigidine, Inc., New York City. Composition: calcium carbonate, soap, a magnesium compound, carbon tetrachloride (1.2 per cent), gum, glycerine, and water, flavored with peppermint oil. Claims for treatment of pyorrhea, prevention of oral decay, aiding the flow of saliva, etc., were false and fraudulent. (Notice of Judgment 20888, issued June, 1934.)

Nuran Tablets.—LaSalle Laboratories, Detroit, Mich. Composition: acetphenetidin. 1.8 grains, acetylsalicylic acid, 3.7 grains, and caffeine, 0.25 grain each tablet. Claims for treatment of toothache, etc., were false and fraudulent. (Notice of Judgment 20892, issued June, 1934.)

Dunlop Pyorrhea Paste.—Emme Dental Specialty Co., St. Paul, Minn. Composition: boric acid, glycerin, alcohol (4.4 per cent by weight) and water, flavored with peppermint oil. Claims for pyorrhea and mouth diseases were false and fraudulent. (Notice of Judgment 20910, issued June, 1934. See also Notices of Judgment 19161 and 19158, issued October, 1932.)

Ethyl Borate.—Emme Dental Specialty Co., St. Paul, Minn. Composition: boric acid (alcohol 1 per cent by volume), and water flavored with oil of peppermint. Claims for it as an antiseptic mouth wash and in treatment of pyorrhea, trench mouth, purulent alve-

olitis, pus diseases, etc., were false and fraudulent. (Notice of Judgment 20914, issued June, 1934.)

Aspirin Tablets.—American Pharmaceutical Co., Inc., New York City, Aspirin Co., of America. Claims for treatment of toothache and as an antiseptic gargle, etc., were false and fraudulent. (Notice of Judgment 20917, issued June, 1934.)

Pyrodento.—Pyrodento Co., Baltimore, Md. Composition: saccharin, benzoic acid and volatile oils including menthol, thymol, cassia oil and clove oil, alcohol (18.4 per cent by volume) and water. Claims for it as an antiseptic gargle and mouth wash were false and fraudulent. (Notice of Judgment 20920, issued June, 1934.)

Gin-ga-sol.—Gingasol Laboratories, Inc., Winner, S. D. Composition: potassium chlorate and potassium chloride, a trace of a substance yielding free chlorine, alcohol (2.1 per cent by volume), glycerin and water. Claims for sore and bleeding gums, pyorrhea, trench mouth, gingivitis, etc., were false and fraudulent. (Notice of Judgment 20930, issued June, 1934.)

Nofal.—Lifol Co., Tulsa, Okla. Composition: coal tar creosote, rosin soap, alcohol and water. Claims for treatment of pyorrhea, bleeding gums, etc., were false and fraudulent. (Notice of Judgment 20948, issued June, 1934.)

Sodium Perborate.—American Pharmaceutical Co., Inc., New York City. Composition: sodium perborate, flavored with spearmint oil. Bacteriologic examination showed that the product was not antiseptic when used as a mouth wash. Claims for the treatment of pyorrhea, trench mouth, gingivitis and as an antiseptic mouth wash were false and fraudulent. (Notice of Judgment 21176, August, 1934.)

Rayburn's Easy Antiseptic.—W. S. Rayburn & Sons, Chicago, Ill. Composition: petrolatum, benzaldehyde, camphor and a coloring material. Claims for antiseptic action were false and fraudulent. (Notice of Judgment 21180, issued August, 1934.)

Radumac.—Walter Gerke, Sacramento, Calif., and McKesson-Kirk-Geary Co., Sacramento, Calif. Composition: water solution of ferrous and ferric sulphates with traces of aluminum, zinc and sodium compounds including phosphate. Claims regarding "Teeth: Loose, Sore; Bleeding Gums; Pus About Teeth . . ." were false and fraudulent. (Notice of Judgment 21181, issued August, 1934.)

Grimes' Ointment.—Grimes Ointment Co., Ellen Garey, Los Angeles, Calif. Composition: Volatile oils including camphor, reducing sugars such as honey, glycerin, rosin and opium extract incorporated in an ointment base such as petrolatum and tallow. Claims for pyorrhea, etc., were false and fraudulent. (Notice of Judgment 21183, issued August, 1934.)

Thor's Vitamin Compound.—Thor Pharmacal Co., Atlanta, Ga. Composition: plant material including nux vomica and a laxative drug, compounds of iron and copper, phenolphthalein, and yeast. Biologic examination showed that the article was worthless as a source of vitamin D. Claims for curative and therapeutic effects were false and fraudulent. (Notice of Judgment 21189, issued August, 1934.)

Mayo's Dentifrice.—Mayo's Laboratories, Inc., Oklahoma City, Okla. Composition: sodium sulphocarbolate, soap, glycerin and water, colored with a red dye. Claims for trench mouth and gum troubles, pyorrhea, Rigg's disease, etc., were false and fraudulent. (Notice of Judgment 21203, issued August, 1934.)

Merrell's Penetrating Oil.—Dick Dunn Drug Products Co., St. Louis, Mo. Composition: volatile oils including turpentine oil and eucalyptol. Claims for aching teeth, etc., were false and fraudulent. (Notice of Judgment 21205, issued August, 1934.)

Pine-O-Sol.—Purity Chemical Products Co., Santa Rosa, Calif. Composition: mineral oil (61 per cent) and pine oil (39 per cent). Antiseptic claims were false and fraudulent. (Notice of Judgment 21211, issued August, 1934.)

Catalyn.—Vitamin Products Co., Milwaukee, Wis. Composition: plant material including wheat bran, wheat starch, glandular material including epinephrine and milk

sugar. Claims that it ". . . supplies the vital elements necessary for normal functioning of the human system . . . has the remarkable property of promoting vitality and aiding nature in restoring the organs to normal function," acts as a "catalyst," etc., were false and fraudulent. (Notice of Judgment 21213, issued August, 1934.)

Regum Mouth Paste.—Morgan & Sampson, San Francisco, Calif. Composition: calcium carbonate, glycerin, soap, small proportions of zinc chloride and resins, and water flavored with aromatics. Claims for treatment of bleeding gums and pyorrhea, retarding the formation of tartar and as an active antiseptic were false and fraudulent. (Notice of Judgment 21221, issued August, 1934.)

G.C.C. Golden Chemical Compound.—International Chemical Co., Topeka, Kan. Composition: iron sulphate in water. Claims for sore mouth, bleeding gums, pyorrhea and trench mouth were false and fraudulent. (Notice of Judgment 21222, issued August, 1934.)

Cre-Cal-Co.—Creo Chemical Co., San Antonio, Tex. Composition: phenolic substance, such as creosote, and approximately 99 per cent water. Claims of an antiseptic action were false and fraudulent. (Notice of Judgment 21224, issued August, 1934.)

Edrolax.—Edros Natural Products, Inc., New York City. Composition: a mixture of seed of Plantago ovata, P. psyllium, P. lanceolata, and lallemantia, royelana, agar-agar and caramel. Claims for it as an accessory food were false and fraudulent. (Notice of Judgment 21226, issued August, 1934.)

Dr. E. A. Welters Wonderful Tooth Powder.—E. A. Welters Tooth Powder Co., Chicago, Ill. Composition: calcium carbonate, soap, and alum flavored with peppermint oil and sweetened with saccharin. Claims for preventing decay and "toughening" tender gums were false and fraudulent. (Notice of Judgment 21247, issued August, 1934. See also Notice of Judgment 18335, issued January, 1932; Notice of Judgment 18746, issued May, 1932, and Notice of Judgment 19031, issued July, 1932.)

Apinol.—Apinol Corporation, Wilmington, N. C. Composition: Essentially pine oil. Claims for combating pyorrhea, etc., were false and fraudulent. (Notice of Judgment 21248, issued August, 1934.)

Lee's Antiseptine Powder.—Moore & Co., Inc., Worcester, Mass. Composition: "Aluminum Sulphate . . . Oxyquinolin Sulphate." The product contained no aluminum sulphate and no oxyquinolin sulphate. Claims as a germicide were false and fraudulent. (Notice of Judgment 21259, issued August, 1934.)

M R Son Pink Wonders.—M. R. Son Co., Inc., Boston, Mass. Composition: 2.5 grains of acetphenetidin (a derivative of acetanilid) and 3.5 grains of acetylsalicylic acid each tablet. Claims for treatment of toothache, etc., were false and fraudulent. (Notice of Judgment 21502, issued August, 1934.)

Rx A. S. Royce Antiseptic Solution.—National Medical Products Co., Los Angeles, Calif. Composition: boric acid (0.5 gram per hundred milliliters), traces of volatile oils, including methyl salicylate and thymol, oxyquinoline sulphate and water. Claims for pyorrhea, gingivitis, etc., were false and fraudulent. (Notice of Judgment 21507, issued August, 1934.)

Zinc-O-Cide.—Weinberger Drug Stores, Inc., Cleveland, Ohio. Composition: zinc chloride, small proportions of volatile oils including menthol, clove oil and cassia oil, saccharin, alcohol, and water, colored with a red dye. Claims for pyorrhea treatment and ability to keep the gums firm and healthy, were false and fraudulent. (Notice of Judgment 21515, issued August, 1934.)

Key Tasteless Cod Liver Extract Tablets.—Key Laboratories, Chicago, Ill. Composition: starch, sugar and talc in which was incorporated 8.3 mg. per tablet of chloroform-soluble material including fatty material and an extract from a bitter drug, coated with calcium carbonate and colored with iron oxide. Claims for strengthening the teeth, etc., were false and fraudulent. (Notice of Judgment 21518, issued August, 1934.)

Dentoris.—Ford Hopkins Co., Chicago, Ill. Composition: boric acid, small proportions of thymol and salicylic acid, alcohol and water, colored with a yellow dye. Claims for tender, bleeding gums, pyorrhea, keeping the gums firm, etc., were false and fraudulent. (Notice of Judgment 21546, issued August, 1934.)

Sterodent Prophylactic Cleanser and Steraseptic Tablets.—Sterile Products Co., San Diego, Calif. Composition: (Cleanser) powdered silicate, calcium carbonate, borax, and glycerin, flavored with spearmint oil and colored with a pink dye. Aluminum sulphate and lactose, flavored with peppermint oil and colored with a red dye (tablets). Claims for treatment of Vincent's infection (cleanser), pyorrhea, infected gums (tablets), etc., were false and fraudulent. (Notice of Judgment 21552, issued August, 1934.)

Liberty Liniment.—Clyde Collins Chemical Co., Memphis, Tenn. Composition: petroleum distillate, such as kerosene, and a small proportion of methyl salicylate. Claims for toothache, etc., were false and fraudulent. (Notice of Judgment 21556, issued August, 1934.)

Aspirin Tablets.—Blackman & Blackman, Inc., New York City. Claims for toothache, etc., were false and fraudulent. (Notice of Judgment 21571, issued August, 1934.)

Salomint Dental Cream.—New England Collapsible Tube Co., New London, Conn., Sal-O-Dent Laboratories, Inc., Pittsburgh, Pa. Composition: calcium carbonate, magnesium hydroxide, sodium chloride, soap, and water with flavoring and coloring material. Claims for the treatment of soft flabby gums, receding gums and tender bleeding gums were false and fraudulent. (Notice of Judgment 21576, issued August, 1934.)

Parkelp.—Philip R. Park Laboratories, Inc., Chicago, Ill. Composition: ground plant material yielding 29 per cent of ash consisting of compounds of calcium, magnesium, iron, manganese, copper, sodium, potassium, sulphur, phosphorus and iodine. Claims for supplying needed food minerals were false and fraudulent. (Notice of Judgment 21583, issued August, 1934.)

Pyro-Sana Tooth Paste.—Alhosan Chemical Co., St. Louis, Mo. Composition: calcium carbonate, soap, glycerin, creosote and water. Claims for treatment of pyorrhea, preserving the gums, etc., were false and fraudulent. (Notice of Judgment 21588, issued August, 1934. See also Notice of Judgment 20383, issued December, 1933.)

A-Vol Tablets.—D. P. C. Laboratories, Holton, Kan. Composition: 1.3 grains to 1.5 grains of acetphenetidin, each tablet. Claims to relieve pain were false and fraudulent. (Notice of Judgment 21596, issued August, 1934. See also Notice of Judgment 22018, issued September, 1934.)

Medisalt.—Carey Salt Co., Hutchinson, Kan. Composition: sodium chloride, magnesium carbonate, and water, flavored with menthol and cassia oil. Claims for stimulating the activity of the gums, as a gargle for mouth, etc., were false and fraudulent. (Notice of Judgment 21599, issued August, 1934.)

Phenlin-Oris.—John H. Wood Co., Philadelphia, Pa. Composition: ointment with a petrolatum and paraffin base containing small proportions of cresylic acid and water. Claims as a preventive against infection were false and fraudulent. Bacteriologic examination showed the product was not antiseptic. (Notice of Judgment 21781, issued September, 1934.)

Tru-Aspingum and Tru-Koff-Ade.—Tru-Lax Manufacturing Co., Newark, N. J. Composition: Tru-Aspingum: acetylsalicylic acid and salicylic acid incorporated in a mixture of sugar, starch and gum; Tru-Koff-Ade: peppermint oil, a pungent substance, such as red pepper, and a trace of an alkaloid, incorporated in a mixture of sugar, starch and gum. Claims for "sore spots in the mouth . . ." and ". . . irritations of the throat and mouth" were false and fraudulent. (Notice of Judgment 21782, issued September, 1934.)

Giles' Germicide.—Giles Remedy Co., and Sanford F. Giles, Chicago, Ill. Compo-

sition: linseed oil, camphor and ether. Claims for toothache, etc., were false and fraudulent. (Notice of Judgment 21787, issued September, 1934.)

Aspirsal.—Charles M. Hick and Charles M. Hick & Co., Chicago, Ill. Composition: acetylsalicylic acid (4.5 grains per tablet) and phenolphthalein. Claims for toothache, etc., were false and fraudulent. (Notice of Judgment 21791, issued September, 1934.)

Riggs'-O-Dean Mouth Wash.—Riggs'-O-Dean Products, Inc., and Isaac Platt, Chicago, Ill. Composition: potassium iodide, tannic acid, volatile oils, including peppermint oil and cassia oil, a trace of aconitine, alcohol (2.7 per cent by volume) and water, colored with a yellow dye. Claims for treatment of trench mouth, "to assist in removing mucin plaque . . ." as "treatment, remedy, and cure for pyorrhea, gingivitis, and receding gums," were false and fraudulent. (Notice of Judgment 21797, issued September, 1934.)

Pyroligneous Compound No. 1 and Pyroligneous Compound No. 2.—Lester Tilton and Tilton Laboratories, Clinton, Iowa. Composition: (No. 1) ammonium carbonate, ammonium hydroxide, and pyridine and water (approximately 98 per cent); (No. 2) ammonium hydroxide and pyridine, a trace of a phenolic substance and water (approximately 98 per cent). Claims for treatment of sore mouth, pyorrhea, etc., were false and fraudulent. (Notice of Judgment 21801, issued September, 1934.)

Ora-Noid Mouth Powder.—Ora-Noid Co., Chicago, Ill. Composition: salt, chalk, bicarbonate of soda, calcium phosphate, magnesium phosphate, potassium phosphate, sodium phosphate, magnesium sulphate, potassium sulphate, bicarbonate of potassium and cinnamon and clove flavoring. Claims for treatment of pyorrhea, trench mouth, gingivitis, and that it "draws the germs out of the crypts in the tissues." etc., were false and fraudulent. (Notice of Judgment 21803, issued September, 1934.)

Pyradium.—Radium Remedies Co., Minneapolis, Minn. Composition: zinc sulphate, sodium chloride, boric acid, glycerine and water, flavored with peppermint oil. Claims for pyorrhea, trench mouth, bleeding gums, etc., were false and fraudulent. (Notice of Judgment 21812, issued September, 1934. See also Notice of Judgment 18371, issued February, 1932, and Notice of Judgment 19166, issued October, 1932.)

Dunlop Pyorrhea Paste.—Emme Dental Specialty Co., St. Paul, Minn. Composition: boric acid, glycerin, peppermint oil, water and alcohol 3 per cent by weight. Claims for pyorrhea and mouth diseases were false and fraudulent. (Notice of Judgment 21817, issued September, 1934. See also Notice of Judgment 19161, issued October, 1932; Notice of Judgment 19158, issued October, 1932, and Notice of Judgment 20910, issued June, 1934.)

Pyorrhea Remedy.—A. J. Holden, Rawlings, Wyo. Composition: extracts of plant drugs, salicylic acid and water. Claims for treatment of pyorrhea, Vincent's infection, gingivitis, sore gums, etc., were false and fraudulent. (Notice of Judgment 21821, issued September, 1934.)

PX for Personal Hygiene.—P. X. Products Co., Detroit, Mich., and Los Angeles, Calif. Composition: zinc chloride, sodium chloride, ammonium alum and water. Claims for treatment of pyorrhea, trench mouth, etc., were false and fraudulent. (Notice of Judgment 21825, issued September, 1934.)

Novonol Ointment and the Belmont Germicide.—Fred Harlow Smith, Belmont Co., Springfield, Mass. Composition: Ointment: local anesthetic, such as procaine hydrochloride, incorporated in a mixture of fatty acids and petrolatum; germicide: sodium chloride, borax, camphor, menthol and methyl salicylate. Claims as an antiseptic and germicide were false and fraudulent. (Notice of Judgment 21976, issued September, 1934.)

Styp-Strin-Gant.—Lawrence Chemical Co., Atlanta, Ga. Composition: potassium iodide, formaldehyde, tannic acid, glycerin and water. Claims for treatment of pyorrhea, sore gums, gum troubles, soft and spongy gums, and Rigg's disease were false and fraudu-

lent. (Notice of Judgment 21988, issued September, 1934. See also Notice of Judgment 18210, issued October, 1931.)

Zepyrol.—Stearns-Hollinshead Co., Inc., Portland, Ore. Composition: zinc chloride, sodium chloride, glycerin, saccharin, alcohol (2.5 per cent by volume) and water flavored with aromatics and colored with a red dye. Claims for relieving pyorrhea and germ diseases, as a germicide for the mouth, etc., were false and fraudulent. (Notice of Judgment 22002, issued September, 1934.)

I-den-tine Dental Cream.—Trade Laboratories, Inc., Newark, N. J. Composition: calcium sulphate, calcium phosphate, small proportions of glycerin and soap, traces of pepsin and an iodine compound, and water flavored with peppermint oil. Claims for pyorrhea and bleeding gums were false and fraudulent. (Notice of Judgment 22006, issued September, 1934.)

Osmo Kaolin.—E. Fougera & Co., Inc., New York City. Composition: fine, soft clay containing no organic material nor any mineral salts. Claims for relieving pain and swelling of local inflammation, etc., were false and fraudulent. (Notice of Judgment 22178, issued September, 1934.)

Phytamin Tablets.—Phytamin Corporation, New York City or Battle Creek, Mich. Composition: brown sugar-coated tablets containing calcium phosphate, iron phosphate, extracts of plant drugs, small proportions of sodium, potassium, iodine and carbonate compounds, volatile oils including oil of cinnamon and oil of cloves, a fixed oil, starch and yeast. Claims for vitamin therapy were false and fraudulent. (Notice of Judgment 22184, issued September, 1934.)

Ru-Co Aspirin.—Clyde Collins Chemical Co., Memphis, Tenn. Composition: 4.8 grains of acetylsalicylic acid to each tablet. Claims for treatment of toothache, etc., were false and fraudulent. (Notice of Judgment 22189, issued September, 1934.)

Salomint Dental Cream.—Sal-O-Dent Laboratories, Inc., St. Louis, Mo. Composition: calcium carbonate, magnesium hydroxide, sodium chloride, soap, and water together with peppermint oil and red coloring in one variety and mint oil and green coloring in the other. Claims for receding gums, tender bleeding gums, etc., were false and fraudulent. (Notice of Judgment 22192, issued September, 1934. See also Notice of Judgment 21576, issued August, 1934.)

Parkelp.—Philip R. Park Laboratories, Inc., Chicago, Ill. Composition: ground plant material containing such inorganic constituents as compounds of sulphur, iodine, phosphorus, calcium, sodium, potassium, magnesium, iron, manganese and copper as commonly occurs in plants. Claims for vitamin therapy were false and fraudulent. (Notice of Judgment 22194, issued September, 1934. See also Notice of Judgment 20911, issued June, 1934, and Notice of Judgment 21583, issued August, 1934.)

Petro-Ido.—White Specific Toilet Co., Nashville, Tenn. Composition: 0.05 per cent iodine dissolved in mineral oils. Claims as an antiseptic oil for sore mouth, etc., were false and fraudulent. (Notice of Judgment 22198, issued September, 1934.)

Furstenberg's Felsol.—American Felsol Co., New York City. Composition: antipyrine (phenazone), acetphenetidin (a derivative of acetanilid), caffeine and an iodine compound. Claims for curative and therapeutic effects were false and fraudulent. (Notice of Judgment 22328, issued November, 1934. See also Notice of Judgment 22341, issued November, 1934.)

Kelp-A-Malt.—Allied Laboratories, New York City. The Kelpamalt Company, New York City. Composition: ground vegetable material, starch, malt extract, and 14.9 per cent of ash (mineral matter) including compounds of copper, manganese, iron, magnesium, calcium, potassium, silica, phosphorus and iodine. Claims for curative properties in certain deficiency diseases, etc., were false and fraudulent. (Notice of Judgment 22338, issued November, 1934.)

BUREAU OF PUBLIC RELATIONS

INCIPIENT ORTHODONTIC NEEDS*

By HENRY F. HOFFMAN, D.D.S., F.A.C.D., Denver, Colo.

WHILE the discussion of technical procedures has made necessary the organization of the sections on Mouth Hygiene and Preventive Dentistry and on Orthodontia, we should be ever cognizant that, in service, our objectives are identical; that we are all specializing in the great field of prevention.

This paper is not intended as the basis for a complete orthodontic diagnosis. A diagnosis of orthodontic needs requires special education and experience, aided by roentgenographic examination, models and photographs. I will merely attempt in this presentation to illustrate some of the most definite abnormalities occurring commonly among young children and calling for immediate attention, but which are only too frequently overlooked by the general practitioner or the pedodontist at that age when the abnormality could most easily be corrected.

Cases in children 10 years of age or older, with complicated conditions which could have been prevented by a short period of treatment had the malocclusion been detected and treated in its incipiency, are continually seeking orthodontic treatment.

Several years ago, the theory was advanced that every denture which failed to show arch development conforming to the accepted ideal of development at 5 or 5½ years of age was in malocclusion and should have immediate treatment to insure the proper eruption of the permanent teeth.

This theory, coming from the mouths of authorities, was quite generally accepted, with questions and reservations by some, but blindly by many, the result being simply amazing from the immediate economic standpoint of the orthodontist. Countless cases were started without other evidence of the need for treatment than was indicated by this theory, and treatment was continued in an effort to anticipate the future moves of nature.

Many of these with good luck, under skilful hands, capable of visualizing the individual development to take place, with reasonable immunity to caries on the part of the patient and with efficient prophylaxis, have met with no physical harm and have terminated their years of treatment with dentures as good or even somewhat better than nature, unaided, might have supplied. Others, less fortunate in having all those features tending toward a successful termination of prolonged orthodontic treatment, such as immunity to caries, careful and continued prophylaxis and treatment by operators able to anticipate the needs of nature, did not fare so well, and stand today as

*Read before the Section on Mouth Hygiene and Preventive Dentistry at the Seventy-Sixth Annual Session of the American Dental Association, St. Paul, Minn., Aug. 8, 1934.

monuments to the lasting disgrace of this dogmatic theory.

With the passing of time, operators and research workers, by records, observations and clinical experience, have disproved the infallibility of this theory, and we now recognize that many other factors must be taken into account before even attempting to foretell what, in many cases, may develop into a real malocclusion in the adult denture.

It is not within the province of this paper to even hint at what should be done or when treatment should be begun with the usual types of malocclusion or apparent malocclusion, as this is often a

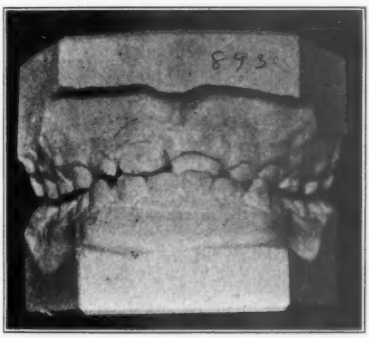


Fig. 1.—Maxillary left permanent central and deciduous lateral incisors and cuspid in lingual occlusion. Correction required six weeks' treatment.

problem for the experienced orthodontist in comparison with which the technical requirements for conducting successful treatment are insignificant.

Many of the younger cases should, after having complete and accurate records made, including roentgenograms and models, be placed under observation until such time as the trend of development, the advisability of treatment and the period when it might best be started can be better judged.

The ability to place appliances on teeth does not meet a major requirement for the practice of orthodontia. The real test of an orthodontist lies in his ability to recognize the biologic processes accompanying the development of a denture.

A study of the records of a large group of children receiving no orthodontic in-

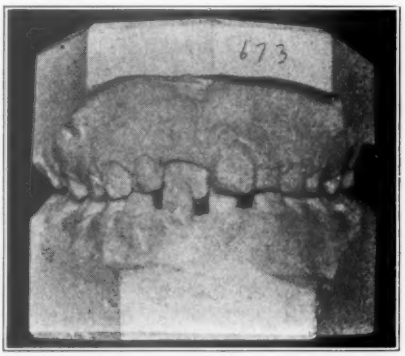


Fig. 2.—Maxillary right central incisor in lingual occlusion.

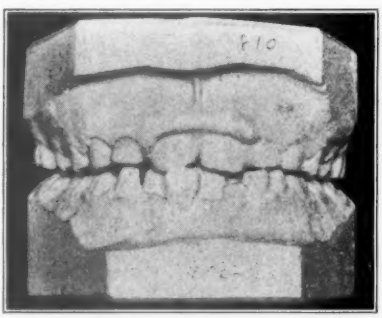


Fig. 3.—Maxillary right central incisor in lingual occlusion. The mandibular right central incisor was crowded out of line labially; which caused recession of the gingival tissues. The patient was aged 8 years and 9 months.

terference, covering the period to the completion of the permanent denture, is in itself a conclusive proof that immediate

interference is not universally desirable at an early age.[1]

There are certain types of incipient malocclusion in which immediate interference is indicated and concerning which no question exists as to the advisability of immediate treatment. While these cases should be easily diagnosed by any dentist, they are frequently overlooked until complicated malocclusion has developed.

These are, in the main, those types which offer, through the malocclusion of one or more teeth, mechanical interference with development. Because of the changes taking place during the developmental period in the alveolar process and the maxillary and facial bones, mechanical interference in the occlusion, if uncorrected, is generally accompanied by a progressively increasing malocclusion.

Although, as I have said, these cases are easily diagnosed, they are, notwithstanding, frequently overlooked at the time that they first become evident and

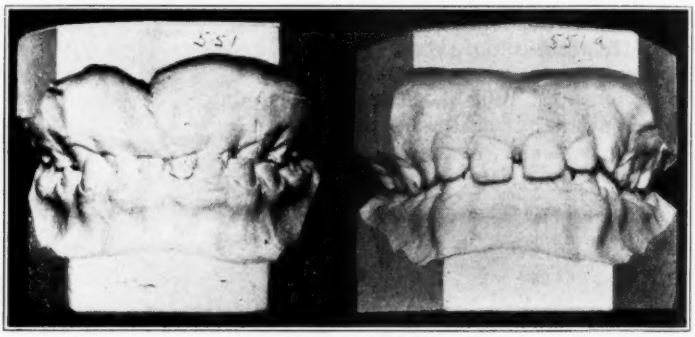


Fig. 4.—Left: Six anterior maxillary deciduous teeth in lingual occlusion. The case was treated six months only. Right: Appearance of case five and one-half years after treatment.

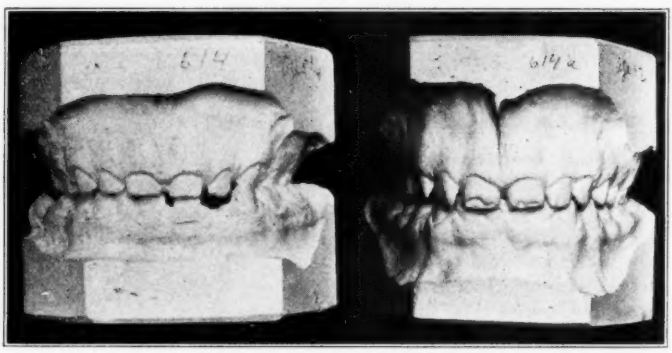


Fig. 5.—Left: Maxillary deciduous teeth on left side in lingual occlusion. The case was treated seven months only. Right: Appearance of case six and one-half years after treatment.

1. Lewis, S. J., Proper Time to Start Orthodontic Treatment, J.A.D.A., 20:693 (April) 1933.

when they could be most easily corrected. That they are overlooked is evidenced by the large number later coming to orthodontists, and which, although they have been under the regular care of a dentist, have received no suggestion of need for treatment until they present very evident examples of malocclusion. In many of these cases, I am forced to believe that the early evidences of malocclusion have simply been overlooked through insufficient examination rather than indifference.

The general practitioner, wishing to give his patients economic service should be on the alert to detect the first evidence of these early types of malocclusion, which can be so easily and permanently corrected.

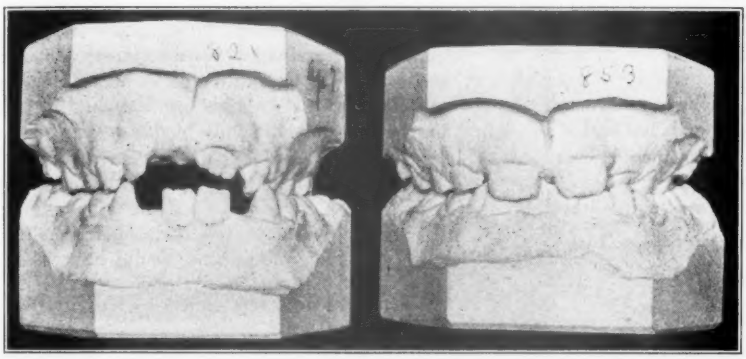


Fig. 6.—Maxillary deciduous teeth and first permanent molar on left side in lingual occlusion. Left: Case treated twelve months. Right: Case treated seven months.

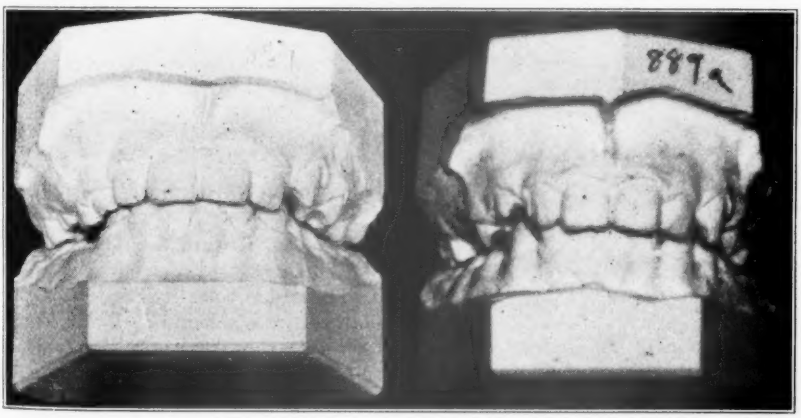


Fig. 7.—Left: Maxillary left first bicuspid in buccal occlusion. Right: Occlusion as corrected in three months.

The chief cause of failure to recognize these conditions is doubtless failure to observe the occlusion closely. Often, the

individual arches show little or no evidence of malocclusion when examined separately, but observed in occlusion present some marked departure from normal, which, through the forces of occlusion, prevent normal development.

As this is not a discourse on treatment I shall show treated dentures only when necessary to demonstrate the point desired.

Maxillary and mandibular incisors in lingual or labial occlusion are perhaps the most frequently encountered. This condition is the most easily corrected unless complicated with other conditions, such

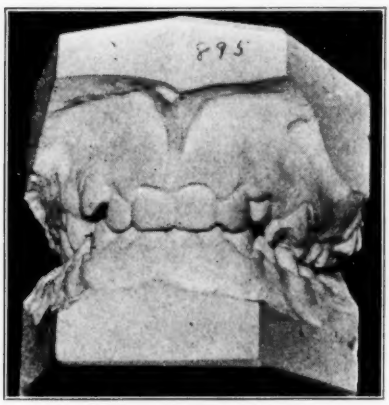


Fig. 8.—Left maxillary first bicuspid and second molar in labial occlusion; case in which a much longer period of treatment will be required.

as contraction of the arches. Most of these cases, when the arches are observed separately, as with the mouth open, give little cause for apprehension or, at most, they fail to show the condition of greatest concern; but with the teeth in occlusion, the malocclusion becomes instantly apparent, and it should be evident to even the most inexperienced that the forces of occlusion offer a mechanical interference with normal development.

Figure 1 shows a case, in a child aged 8, which was treated only six weeks, treatment of the deciduous lateral incisor and cuspid being assisted by grinding. The maxillary permanent lateral incisors may require treatment when they erupt, but no appliances are needed in the meantime, and the prognosis for but little if any future treatment is very favorable.

Economically this is an excellent case to discuss. This was the child of an unemployed family having a very small income. They could pay a profitable fee for the service required at this time, but had the case been allowed to progress to a complicated malocclusion, the collection of a profitable fee would have been im-

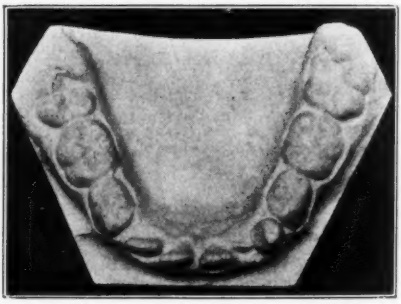


Fig. 9.—Loss of mandibular right cuspid, with space nearly closed; in a child aged 7.

possible and the case would necessarily have either received no treatment or have been treated as a charity case.

In Figure 2, a denture is shown which, crowded as the anterior teeth appear, does not give indications as to how serious the malocclusion is until the teeth are examined in occlusion, when it is seen that the mandibular right central incisor is in lingual occlusion, a condition effectively preventing normal development. This case, in a child aged 8½, was treated but three and a half months, the denture developing very satisfactorily without further treatment.

Figure 3 shows the case of a child aged 8 years and 9 months which was not referred by a dentist, but in which the mother discovered that the mandibular right central incisor was extremely loose and fortunately became worried. The position of the maxillary central incisors were corrected in about three months, but additional treatment to make space for the lateral incisors was indicated, after which the patient was without appliances of any kind until the eruption of the second permanent molars. Without more treatment than was necessary to correct the position of the central incisors, this case would have developed into a functionally satisfactory denture.

When one tooth erupts so far labially as did this right mandibular central incisor, there is generally a recession of the gingival edge of the alveolus, due probably to failure of the gingival margin of the alveolus to develop. Such a recession is permanent and is frequently a cause of periodontal disease in later life.[2]

Figure 4, left, shows a case in a child aged 6 who had the upper six anterior teeth in lingual occlusion and a definite mandibular protrusion. It was treated five and a half months. Figure 4, right, shows the case seven years later with no further treatment. Certainly a strong argument for early treatment of such conditions.

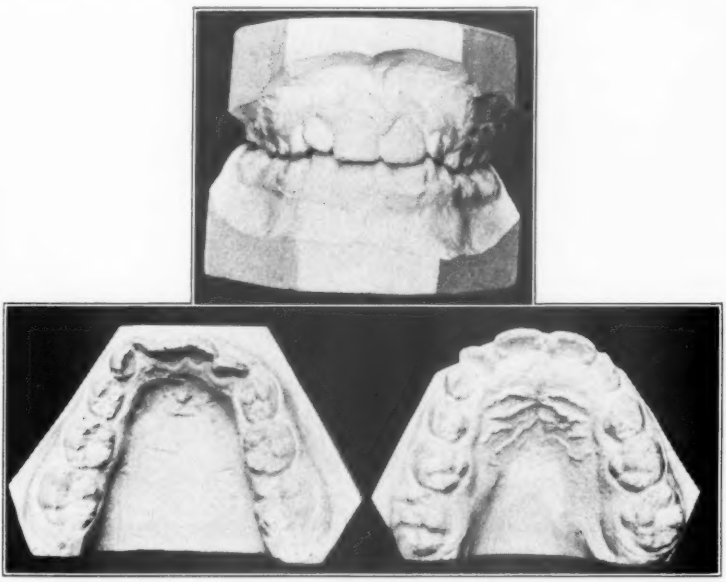


Fig. 10.—Loss of maxillary left and mandibular right cuspids, with spaces entirely closed; in a child aged 9.

The next type of malocclusion of which I wish to speak is that commonly referred to as cross bite.

2. Hirschfeld, Isadore: Periodontist's Appreciation of Orthodontia, D. Cosmos, 66:725 (July) 1924. Hoffman, H. F., Influence of Orthodontia on Treatment and Prevention of Periodontal Disease, J.A.D.A., 18:1963 (Oct.) 1931.

Figure 5, left, is from the case of a child aged 5 years and 9 months, who had the mandibular teeth from the cuspid distally, on the left, in buccal occlusion and the median line of the mandible to the left of the median line of the maxilla. This case was treated seven months and received no subsequent treatment. Figure 5, right, shows the case six and a half years after treatment. Before treatment, the arches, observed separately, would not have disclosed a malocclusion. Had this malocclusion not been detected and treated at an early age, the result would have been a difficult and protracted treatment, with probably some permanent facial disproportion. Such cases of malocclusion are of relatively frequent occurrence. Figure 6, left, shows such a case treated twelve months and retained nine months. Figure 6, right, shows a case treated seven months and retained five months. Both cases required considerable expansion in addition to what was needed to place the maxillary buccal teeth in labial occlusion. With this type might be included those having maxillary bicuspids in labial occlusion. These should be corrected at the earliest possible moment. Figure 7, left, shows a typical case which required three months' treatment. In Figure 7, right, although the bicuspids are noticeably out of line, the malocclusion might easily have been overlooked, unless the teeth had been observed in occlusion.

Figure 8 shows another case in a child somewhat older in which the first bicuspid and second permanent molar are both in labial occlusion. This type of malocclusion in fully developed dentures requires years of treatment where months would have sufficed if treatment had been instituted when the malocclusion first became apparent.

Fig. 11.—Impaction of mandibular bicuspid resulting from premature loss of second deciduous molar, with complete closing of space.

A type in which the potential malocclusion is overlooked until it has become a complicated case is that in which, following the premature loss of the deciduous cuspids, there is a complete or nearly complete closing of the spaces. The deciduous cuspids are quite frequently lost by absorption of the roots two or three years before it is time for the permanent successors to erupt, it being not unusual to find that deciduous cuspids, particu-

larly mandibular deciduous cuspids, have been lost at 6 years of age, or earlier, and the spaces closed. Figure 9 shows the lower right mandibular cuspid space nearly closed in a child aged 7. When these spaces are closed, they should be opened at an early age. This patient, at 9 years of age (Fig. 10), had lost the maxillary left and mandibular right deciduous cuspids, with complete closure of the spaces. A casual examination might have failed to note the loss of these teeth, since the teeth were not then especially crowded, but when the presence of the permanent cuspids begins to be evident, there is, or should be, consternation in the family, and the child may be accused of having inherited Uncle John's "buck teeth," while, in reality, mother or dentist, or both, have merely mistaken a pathologic condition for the normal one. Parents are not accustomed to regard the loss of a deciduous tooth as a pathologic manifestation under any conditions.

Such cases should be treated early, although, if much of the space is lost, they require a longer period of treatment, followed usually by retention until the permanent teeth erupt.

When the deciduous cuspids are lost prematurely, it may be accepted as the rule that the spaces will close unless retained, an end which should, in my opinion, be attained by employment of an orthodontic appliance capable of periodic cleaning and readjustment, rather than with a fixed space retainer. While such closed spaces often open considerably during development, they seldom, if ever, open sufficiently without treatment to permit proper alinement of the permanent cuspids.

The premature loss of the deciduous molars may cause great damage or none at all.

The forward tipping of the first permanent molar closing the space for the eruption of the second bicuspid (Fig. 11), as a result of the early loss of the second deciduous molar, should be avoided if possible. The first permanent molar does not invariably tip forward markedly under these conditions.

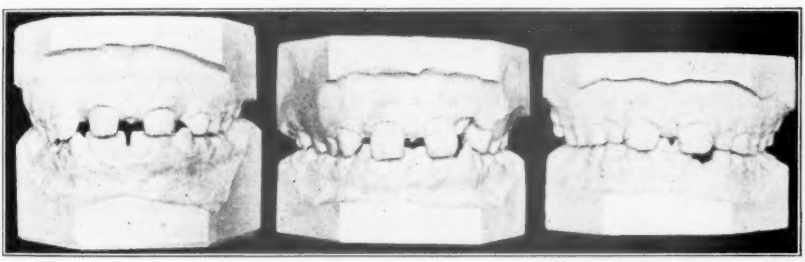


Fig. 12.—Widely spaced central incisors. All spaces were closed and with a normal fraenum labiorum without operation.

The premature loss of the second deciduous molar is usually the result of an extraction, necessary or otherwise, following which there is a delayed eruption of the bicuspids. It is generally during this period of delayed eruption that the first molar may tip mesially; the first bicuspid may erupt and tip distally, or there may be a combination of these movements, resulting in a loss of space, often a complete loss of space, and a disturbance of the occlusion.

When the second deciduous molar is

lost prematurely, the case should be kept under observation, aided by accurate models made from plaster impressions as a guide, and treatment or retention resorted to only when it becomes apparent that the spaces are closing. Retention appliances to be worn over a long period of time should be regarded as orthodontic appliances and should receive the same periodic attention. It may be a doubtful service to require a patient to wear a space retention appliance over a period of years with the accompanying risk to the teeth only to save the few months' treatment required to restore even considerable lost space.

The only justification for using space retainers is a danger of loss of space which will cause a complicated malocclusion. When space retention is under consideration, the following points should be considered:

1. Will the space be lost if no retention is used?

2. Will the case later require treatment for malocclusion even if the space is retained?

3. If the need for treatment for malocclusion at a later date is indicated, will such treatment be further complicated if the space is lost?

4. Which procedure, to fully retain the space or not to retain it, will, in the end, involve less expenditure of time, energy and money, and present the least hazard to the teeth?

I cannot close without reference to what is generally regarded as abnormal space between central incisors and the abnormal *fraenum labiorum* muscle. All widely spaced central incisors are not accompanied by an abnormal frenum. In fact, an abnormal frenum is relatively infrequent. Unusually widely spaced central incisors, especially when accompanied by an apparently abnormal frenum, should receive early treatment to close the space and retain the teeth in mesial contact until at least after the eruption of the lateral incisors. In most cases the frenum will, under such treatment, develop normally.

Figure 12 shows a few typical cases of spaced central incisors all of which were treated in this manner, with permanent closing of the spaces. In none of these was the frenum operated on. All of them were referred as having abnormal *fraenum labiorum* requiring operation.

No case of abnormal attachment of the frenum should be operated on until the eighth or ninth year of age or until vertical development of the maxilla and mandible have taken place. If they are operated on before this period, the attachment of the muscle may not be correct after vertical development has taken place. Operation for an abnormal frenum should never be performed until after the central incisors have been brought into mesial contact; otherwise, the formation of scar tissue will prevent permanently closing the space.

A CITY DENTAL HEALTH PROGRAM*

By E. H. JONES,† D.D.S., Cincinnati, Ohio

PROGRAMS for the betterment of dental conditions must be modified to fit the community for which they are intended. One plan will not fit all communities because of the population, the concentration of people and the economic conditions prevailing. These factors have a definite influence on any endeavor to reach a community.

There are various phases to all programs, such as (1) care of the poor, which we divide into (*a*) emergency and (*b*) preventive care; (2) education of the public, and (3) proper service, which must be provided to care for the increase in patients desiring dental care after an educational program.

Practically all communities have the same experience in initiating health programs. It is natural that most dentists should become aware first of poor children who have aching teeth. This group of children excites the sympathy of the profession, causing a movement to be started to take care of those cases which must have immediate relief. As these cases pour into the clinic, those in charge have a good opportunity to study a great number of mouths, and this study invariably leads to plans which are more constructive than those merely for the relief of pain.

It is very discouraging to extract teeth that have been allowed to decay because of neglect and allow others with smaller cavities to go untreated, with the same prospect of extraction in a few months or a year. The ultimate outcome of constructive thinking is an attempt by those interested to develop some plan to prevent this wholesale extraction of teeth. Some of the clinic time will be allotted to the repair of teeth. This is looking to the future and has a definite purpose of assisting the poor in saving teeth, and from now on relief of pain will become secondary in clinic procedure.

Up to this time, there will have been little demand for dental service except that which relieves pain. Few communities have any desire for more dental attention than this, unless a definite educational program is carried on to arouse an interest in saving teeth.

It is possible to equip clinics for dental care and have them stand practically idle, if an attempt is not made to educate the public to their use. This was proved conclusively in Cincinnati, before an intensive educational program was instituted. Services were primarily intended to treat children who attended the school in which the clinic was located. Clinics being located in the poorer districts, the emergency cases in these schools alone were sufficient to keep the clinics fairly busy; but we found it impossible to keep busy with really constructive work. In an attempt to correct this condition, we sent a hygienist to one of the neighboring large schools. At this time, the work we were doing through our hygienists

*Read before the Section on Mouth Hygiene and Preventive Dentistry at the Seventy-Sixth Annual Session of the American Dental Association, St. Paul, Minn., Aug. 7, 1934.

†Supervisor, Department of Oral Hygiene, Cincinnati Public Schools.

was mostly cleaning and lecturing and we did not reach many schools. The school used in the experiment (the Sands School) was one not ordinarily reached, and the response from this visit by the hygienists was remarkable. The clinic at the Sixth District School, not so very far away, immediately became busier, and it was this demonstration of the hygienist's usefulness which made us realize that the public must be educated.

It was soon realized that if the poor children of the city needed special education in the care of their mouths, in order to get them to come in and receive free treatment, the children from families able to pay for service also needed this training in order to influence to any great degree the dental conditions of the whole city.

For a few years, we continued to concentrate on children in schools where clinics were located, but as the educational program continued, we received more and more demands from other schools for dental attention to the poor in their neighborhoods. As this demand increased, we restricted patients to include children of preschool, kindergarten and first, second and third grades only. Still, because of lack of interest in most schools in the care of teeth, we were able to concentrate on children in a few schools. The response had been so gratifying that it was thought an attempt should be made to examine all elementary school children. This consisted of a dental examination every year for approximately 50,000 children.

Most of these examinations were made possible because prophylaxis was discontinued during school hours. Four hygienists were thereby enabled to accomplish this. The increased number which could be influenced warranted our taking this step.

These children also received instructions in brushing the teeth and lectures on proper foods and regular dental attention. A few years ago, when we started instructing this large number of children, our figures showed that approximately one-third or less received dental attention during the year; but, since that time, there has been a gradual increase in the number of children who receive dental attention regularly, the 1933 examinations showing that more than one-half of these children received dental attention during the year. We think this a very creditable improvement.

There are many difficulties in the way of a good dental health program. First of all, there is the difficulty of having a dependable standard dental examination. In our opinion, a dental examination by hygienists must be made without reference to whether a tooth needs filling or extraction, or to any other definite diagnosis. A hygienist's job should be to find every defective tooth, no matter how small the defect, and the dentist must decide what treatment, if any, is needed.

The "Notice to Parents," calling attention to the defective teeth in a child's mouth, should clearly emphasize the fact that this is not a diagnosis which demands any certain treatment by the family dentist, but is merely a notice periodically sent to the parents, reminding them that the child should receive regular and careful attention. These small defects will not all be filled by the family dentist, for one reason or another. Some members of the dental profession, in an attempt to safeguard their own rights in the care of these children, often go to extremes in order to justify their actions. Many dentists tell parents that "baby teeth do not need attention, because they are going to be extracted anyway." Many dentists even minimize the necessity for early care of the first permanent molars, and while we, with our careful check-up on defects,

do not expect dentists to fill every defect found, we do see a great number of first permanent molars which are left unfilled, when they have very definite cavities, and the answer we get to our inquiry about such cases is this "I see this youngster every three, four or six months and those cavities won't get a chance to develop to any great extent." I wonder if those men have heard that when patients leave their office, they are no longer patients of theirs, unless they return? When we consider the enormous turnover in the average dental practice, we realize that we have no right to send a child out of our office with a cavity which is potentially dangerous, because we do not know that the child will be back in our office, or any other, early enough to check this defect in time to save the tooth.

The average dentist will be greatly surprised to see how many of these tiny defects which were really questionable are found to be in need of filling and are filled over a period of four years. This, if nothing else, bears out our contention that dental examinations must be made with the idea of checking every defect in the child's mouth.

A defect in the enamel deep enough to cause an exploring point to cling when pulled straight out is definite enough to be a probable site for future decay.

Adherence to a strict rule of this kind will cause a certain amount of controversy between those conducting the program and certain members of the profession. These men should stop to think that such methods safeguard them as well as the child. How much easier for the dentist to explain that all of the defective teeth marked do not need fillings than to create suspicion by trying to convince the patient that more cavities need attention than have been charted. This makes the patient wonder who is right, the private dentist or the examiner in the school. The two should cooperate for the good of the patient, and it can be done in such a way as to increase the respect of the patient for both public servant and private dentist.

With this type of examination, it is possible to make comparisons from year to year that could not otherwise be made. If we chart every small defect, we are more apt to know that an increase or decrease in the number found from year to year is due to an actual change in mouth conditions, rather than a difference in instruments or opinion. The less personal opinion we allow to creep in, the more nearly perfect we become.

This personal contact with the child and the many means of capturing his interest in the care of the mouth, such as "Good Teeth" buttons, class banners and thermometers for registering percentage of teeth cared for, will prove to be very productive of results and should be the first step taken. It must be remembered that the ardor of a child can be greatly dampened by lack of interest at home.

For this reason, a good means of making contact with parents should be used. Talks to mothers' clubs are effective, if speakers will spend some time on their talks and illustrate them by such means as lantern slides, posters and moving pictures. Radio programs and newspaper articles reach many more people, and have proved very effective.

One of the phases of education wherein many localities fail, and we admit this of Cincinnati, is in the training of teachers in the principles of mouth hygiene. Teachers have been trained in the importance of clean handkerchiefs and clean finger nails for years, and general hygiene has been made so important to them that most teachers include it in their routine classroom teaching. There are not many teachers so interested in teeth that they spend time trying to influence the

children in their classes to keep their mouths clean. It is almost amusing, although tragic, that so much stress should be placed on the cleanliness of finger nails and ears by an educated group of people and teeth never be given a thought, when the teeth play such an important part in the hygiene of the body and the sanitation of food. This is not the fault of the teaching profession, but the fault of the dental profession in that we have neglected one of our most important groups in our mouth hygiene program. Think what could be accomplished if the interest manifested by our teachers in the cleanliness of children's finger nails alone could be redirected in the interest of clean teeth. The teacher's influence cannot be overestimated, as is well borne out by those few cases wherein she demonstrates an interest in mouth hygiene. Invariably, children under the influence of such a teacher show better mouth conditions than those in classes not so influenced.

I am reminded of a time, several years ago, when we examined a colored school in Cincinnati. Conditions were just as you would expect them to be, with a great predominance of bad mouths. Suddenly we came across a class of children who showed a strikingly improved condition. It was so marked that we sought the reason, our first thought being that the group might be made up of children born in the South. This was not true and, on further investigation, we found the teacher in this class to be responsible. She was especially interested in mouth hygiene and every morning the children in her class had a superficial examination of their teeth to see if they were clean. This is only one example of many cases which showed this same experience.

Here is a group of educated people interested in the welfare of children and in contact with them daily, even more closely than their parents, and their influence must be great, yet we neglect to advise teachers so that they may improve dental conditions.

The simple rules for mouth health are sufficient: how to brush their teeth; the importance of caring for small cavities, and proper diet.

Diet is a very important factor in the care of teeth. We believe this in spite of the fact that there are many varying opinions on the subject. Sometime these opinions are going to crystallize into one constructive method for building bones and teeth and for preserving the teeth from decay. Studies are being made on proper diet for bone-building and tooth-building, and some remarkable results have apparently been achieved in laboratory tests. Authorities agree that they are still very much at sea as to proper diet for the average child.

We had an experience in Cincinnati during the last year which was very interesting. Two groups of eighth grade children, were selected. An eighth-A grade group was used as a control. An eighth-B group was given a pint of vitamin "D" certified milk every noon at school for a period between the first part of January, 1934, and the middle of June, 1934. Both groups received a thorough dental examination in January. This examination included bite-wing roentgenograms of molars and bicuspids, in order to check up on every defect in the mouth.

In June, before the children went on vacation, another dental examination was made of both groups, the roentgenogram again being used. We are sorry to say that, owing to discrepancies in clinical examination, we are unable to state whether there were, or were not, any new cavities in either group. We were able to study the depth of cavities already discovered in the first roentgenograms as compared with the same cavities in the second ex-

amination. We were agreeably surprised at the results obtained.

In the diet group, only five out of twenty showed an increase in size of cavities. The control class consisted of nineteen children. Of this number, fifteen showed an increase in the size of cavities. The question of home diet will be raised, but this is one of the interesting features of the experiment. We wished to find how small a known influence on the average diet would affect the decay of teeth. The children in each of these groups had approximately the same kind of diet. All we know is that one group received a pint of milk a day in addition to anything else they had and over which we had no control. The control group was slightly higher in the social order, in that they were approximately the same age, but had reached a little higher grade in school, and the original examination of their teeth showed fewer cavities, 174, as compared to 250 for the group who received milk. We should continue to teach what we know about diet and what we are going to learn through the efforts of such men as Drs. Bunting and McCollum. We must not let fads in diet cause us to relax our vigilance in the method that we know so well—proper treatment of small defects, which we find in 98 per cent of the children examined.

All of this educational work is sure to have some influence on the public, in direct proportion to the amount of interest and originality injected into the program. Interest of the public in the care of its teeth will be reflected in the income of dentists, and, if for no other reason, they should be glad to cooperate.

It has been definitely proved that such an educational program will practically double the number of children who receive dental attention. The profession must recognize that while it is educating the paying public to regular dental attention, it is also educating a group of people whose financial status will not allow dental fees as a part of their budget. This being the case, the dental profession should be interested in providing that service in some way. One way is to meet it directly as charity and provide clinics for that purpose. Clinics can be operated by volunteer dentists or paid workers, or patients can be taken into private offices for free service. This will depend entirely on the conditions in the community.

Dentistry for children should be essentially preventive, and preventive dentistry calls for the best of dental work. The most nearly permanent fillings are the cheapest. The whole idea of slapping in cement because the cases are charity and seeing a great number of patients has been proved to be wrong.

In the Cincinnati school clinics, cement is never used except as a base for fillings. All grooves are cut out to prevent further decay, not only to save the tooth but also because it is economically sound to prevent as nearly as possible having to refill a tooth. Every attempt should be made to prevent a clinic from becoming an advertising office for nonpaying patients. These clinics are usually sponsored directly or indirectly by the dental society and such organizations cannot afford to lower standards.

The Cincinnati School clinics consist of six full-time chairs and one part-time chair. These clinics put in approximately 9,922 hours during the year, and in this time there were about 38,000 operations performed for 4,800 children, who made 18,353 visits.

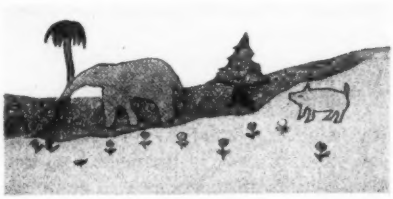
We will be criticized possibly for spending so much time on each child, but we believe this to be far better than having them come back time and again because of work left undone in our hurry to get to a new patient.

This brings us to another phase of the

problem of education. Private practitioners must become interested in children's dentistry. There is a general tendency to pass over patients at this age—to do as little as possible, and what is accomplished is just a makeshift. This is one of our most difficult problems, but if we could solve it, a big step would be taken toward better oral health.

Some may be here in the hope that they will hear something regarding care for adults. This is a serious problem. How to handle it, no one knows. Some think the government should pay for these cases. Some think health insurance to be a good plan, but our belief is that if there must be a choice between caring for adults and caring for children, there can be no doubt about the answer. *Children must come first.* Preventive dentistry must start with the children. It is almost impossible among adults. The best way to preserve adult mouths is to instil into the child's mind the desirability of a clean, healthy mouth. If we can achieve this end among our school children, we will thereby assure healthy mouths among the adult public of the future. This can and should be done, and the dental profession has no right to sit back and say that it has taken care of so many charity patients and let it go at that.

Our goal should be to improve the mouths of the public as a whole, and that can be achieved only through a continuous and interesting program of dental health education.



Suggestions
for a
Teaching Unit
in
Mouth Health

Prepared and Directed by
ANNE RAYMOND

Sponsored by
ORAL HYGIENE COMMITTEE
OF GREATER NEW YORK

Class teaching correlations by
P.S. 222 Brooklyn; 97 Queens; 60 Queens
New York

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THE theme running throughout this unit was to develop those Mouth Health Habits which will secure and maintain sound teeth. In a fifteen weeks' teaching project carried out in the Kindergarten, first and second grades of several schools, the natural interest of children in animals and in the teeth of animals was transferred to an interest in children's teeth and how to safeguard them.

Each class completed a teaching unit which integrated the knowledge on teeth with the class room curriculum. Plays, movies, zoos, circuses, and scrapbooks testified to an active daily interest. Abstracts from the program of three selected schools are offered as suggestions for similar teaching units.

Illustrated by children's handwork

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Price 10 Cents

PYORRHEA

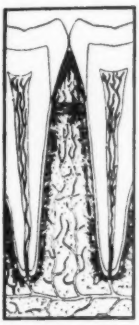

Fig. 1

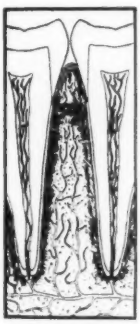

Fig. 2

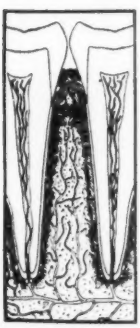

Fig. 3

The following is a fifteen minute steriopticon lecture on the causes and prevention of Pyorrhea. The progressive changes in the destruction of the gum and bone are clearly described in language easily understood by the average lay audience. It is based upon the original Pyorrhea exhibit at the Century of Progress Exposition and is made possible through the courtesy of the Centennial Dental Congress.

The lecture, with colored slides, can be purchased from the Bureau of Public Relations, American Dental Association, 212 E. Superior Street, Chicago, Ill., for $1.50, or rented for 50 cents. The twelve cuts are included in two slides.

The Story of Pyorrhea

From the earliest days to the present, dental records indicate that pyorrhea has resulted in the loss of many more teeth than have been lost by decay. A number of Etruscan mummies have been found in northern Italy with gold bands supporting teeth which had been loosened by pyorrhea. Man doubtless suffered from this disease long before the earliest records.

Pyorrhea occurs infrequently in the mouths of persons under twenty-five years of age, but thereafter the percentage increases with advancing years. There are many causes of this disease. The large majority of cases begin with an irritation of the edges of the gums, followed by a mild type of infection. The irritation is usually of a kind which is either constant or frequently repeated. Minute particles of "tartar" deposited on the teeth under the margins of the gums, or failure on the part of the patient to brush the gums thoroughly, give opportunity for an infection of this type.

The most common cause, probably, is the wedging of particles of food between the teeth in places where the teeth do not touch properly. The food presses against the gum and injures it. This particular type of case is here illustrated.

The picture (Fig. 1) shows a section, supposedly cut through two teeth, including the gum and jaw bone. The enamel crowns, the dentin and the pulps, or "nerves," of these teeth are drawn in outline. The blood vessels are shown passing through the bone, with branches to the teeth and surrounding structures.

The roots of the teeth are supported in sockets in the bone. The outer surfaces of the roots are covered with a substance similar to, but unlike, bone, called cementum. There are thousands of minute "muscle" fibers, which connect the roots with the bone, and serve to cushion the teeth when they are used vigorously in chewing hard foods. These fibers also help to support the gum tissue, which occupies the spaces between the crowns of the teeth. The surface of the gum is covered with protecting layers of cells.

Please notice that the crowns of the two teeth (Fig. 1) touch at a single place, then slope away from each other, and the space

Fig. 4

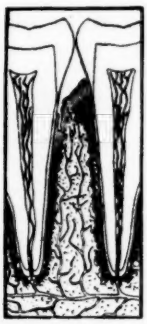

Fig. 5

Fig. 6

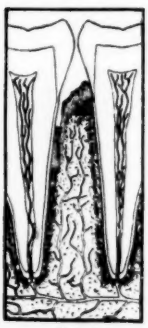

Fig. 7

between them is filled completely with gum tissue. This is the normal; neighboring teeth should touch. In the next illustration (Fig. 2), the two teeth have moved apart just a little, leaving a slight space between them.

This happens occasionally in almost every mouth, because the teeth shift, owing to the extraction of neighboring teeth, to irregularities, or to uneven wear of the chewing surfaces, etc.

When such a space exists, food—particularly meat—is forced in between the teeth in chewing. The food presses the gum down and causes it to be inflamed.

After a time, the gum recedes a little; allowing more food to be packed in (Fig. 3), which causes additional inflammation and more recession of the gum.

As the gum is gradually pressed downward, nature attempts to maintain a layer of protective cells on the surface, in the effort to keep infection out.

As a rule, the gum is slightly inflamed, but usually not painful, and the patient may not know that the gum is injured. The gum will often bleed when brushed.

In the case illustrated (Fig. 4), the injury to the tissue has passed the point where the crown of the tooth joins the root and there is a little detachment of the gum tissue from the root. Infection has generally occurred by this time, and is usually carried into the deeper tissues by lymph vessels, which are indicated by green spots. The lymph vessels are attached to the walls of the blood vessels. Therefore, the infection extends downward in the tissue surrounding the blood vessels.

As the infection progresses, the attachment between the bone and the root is severed, leaving a little tissue adhering to the root (Fig. 5). This is also destroyed later. Thus there is formed a pocket between the gum and the root. That is why this condition is called a pyorrhea pocket.

Soon new changes occur which add to the seriousness of the case. Please look once more at the crowns of the teeth, where they formerly touched (Fig. 1) and are still fairly close together (Fig. 5). It will be observed that the space becomes wider (Fig. 6). So much of the tissue has been destroyed which holds the tooth to the bone, that the teeth actually move apart; which permits more food to wedge between them. A corner of the bone which stands up between the teeth has also been destroyed. More and more of the bone will disappear.

A little pus may now be observed in the pocket near the root. It is shown in yellow (Fig. 7). This infection promptly destroys the little fringe of tissue attached to the root. As the inflammation goes deeper and deeper, more pus is formed.

Pyorrhea thus very slowly destroys the tissue by which the root is attached to the bone, as well as the bone itself (Fig. 8).

Most pyorrhea pockets cannot be completely cured by treatment because of the peculiar structure of the outer surface of the root. The little black spots scattered along the surfaces of the roots of both of these teeth represent the cells which keep the root surface alive. When these cells are destroyed, the corresponding portion of

Fig. 8

Fig. 9

Fig. 10

the surface of the root dies and the gum will not thereafter attach itself to the root. In our picture, these cells have already been destroyed where the tissue has been detached from the root.

As the pocket gets deeper and more pus is formed, the tooth is frequently tender to pressure and becomes loose (Fig. 9).

It is important to remember that this is not a disease of the tooth, but of the soft tissue which connects the tooth with the bone, also of the bone itself. Such a pocket is, therefore, a definite menace to the health, because infection may be carried from it to any part of the body.

Sometimes much more of the bone is destroyed by the formation of an abscess near the bottom of the pocket (Fig. 10).

When food wedges between the teeth and presses on the gum, it usually destroys the attachment to the roots of both teeth, also a part of the bone to which the roots are attached (Fig. 11). It is of importance that such a condition be discovered early, otherwise it may be necessary to extract both teeth (Fig. 12).

Pyorrhea can usually be prevented by very simple means. It requires a cooperative effort on the part of the patient and the dentist. The beginning is always at the margins of the gums. Proper and regular brushing by the patient is very helpful. Frequent attention by the dentist is essential. If particles of food catch between the teeth, the dentist may be able to modify the touch points, or he may instruct the patient in some special method of mouth hygiene. The diet and other general health factors often require attention. Much is being accomplished in preventing this disease. Success depends very largely on early attention and close cooperation between patient and dentist.

Fig. 11

Fig. 12

DENTAL ECONOMICS

Committee on Dental Economics

At the 1934 meeting of the American Dental Association, a committee on dental economics was provided for, consisting of fourteen members, one from each of the Trustee districts, and a representative of the U. S. Public Health Service.

Each member of the committee is to represent the American Dental Association in all economic activities in his district.

The Committee will meet annually during or just preceding the annual meeting of the American Dental Association. A report covering the activities of the economics committee shall be presented to the Board of Trustees and House of Delegates at each annual meeting.

For the more efficient operation of this enterprise, a new department is to be allotted in The Journal each month, under the Bureau of Public Relations, wherein may be discussed all economic problems affecting the welfare of the profession. Any member bringing material to this department must recognize the necessity of condensing his remarks as much as is possible to be consistent with clarity, and of confining himself to his subject.

We feel that this activity has within it potentialities of great good to the profession, and we invite the cooperation of all who are vitally interested in our economic problems. There has long been a demand for such a department, and the Board of Trustees must be commended for two things: first, their decision to inaugurate such a department and, second, their patience and deliberation in seeing that it was properly organized and safeguarded.

C. N. J.

Action of the A.D.A. Board of Trustees in Respect to Compulsory Health Insurance*

The Board of Trustees of the American Dental Association believes that the enactment of a program of compulsory health insurance administered by the federal government, the governments of the individual states, or any individual industry, community or similar body, would inevitably lead to the regimentation and lay control of dental practice, which would not be in the interest of the public. That a lowering of the standards of dental practice would result is indicated by the evidence from compulsory health insurance legislation in the European countries, where it has been in operation for some years and where it not only has failed to accomplish the measures of alleviation expected of it, but also has seriously impeded practitioners of the healing arts in the performance of their duties and has been a barrier to the further scientific development of the professions. The Board of Trustees commends the House of Delegates of the American Medical Association and approves the action pertaining to compulsory health insurance taken at its meeting, Feb. 16, 1935.

Sickness Insurance†

Your reference committee, believing that regimentation of the medical profession and lay control of medical practice will be fatal to medical progress and inevitably lower the quality of medical service now available to the American people, condemns unreservedly all propaganda, legislation or political manipulation leading to these ends.

Your reference committee has given careful consideration to the record by the Board of Trustees of the previous actions of this House of Delegates concerning sickness in-

*Feb. 18, 1935.

†Report of Reference Committee unanimously adopted by the House of Delegates of the American Medical Association, Chicago, Ill., Feb. 16, 1935.

surance and organized medical care and to the account of the measures taken by the Board of Trustees and the officials of the Association to present this point of view to the government and to the people.

The American Medical Association, embracing in its membership some 100,000 of the physicians of the United States, is by far the largest medical organization in this country. The House of Delegates would point out that the American Medical Association is the only medical organization open to all reputable physicians and established on truly democratic principles, and that this House of Delegates, as constituted, is the only body truly representative of the medical profession.

The House of Delegates commends the Board of Trustees and the officers of the Association for their efforts in presenting correctly, maintaining and promoting the policies and principles heretofore established by this body.

The primary considerations of the physicians constituting the American Medical Association are the welfare of the people, the preservation of their health and their care in sickness, the advancement of medical science, the improvement of medical care, and the provision of adequate medical service to all the people. These physicians are the only body in the United States qualified by experience and training to guide and suitably control plans for the provision of medical care. The fact that the quality of medical service to the people of the United States today is better than that of any other country in the world is evidence of the extent to which the American medical profession has fulfilled its obligations.

The House of Delegates of the American Medical Association reaffirms its opposition to all forms of compulsory sickness insurance whether administered by the Federal government, the governments of the individual states or by any individual industry, community or similar body. It reaffirms, also, its encouragement to local medical organizations to establish plans for the provision of adequate medical service for all of the people, adjusted to present economic conditions, by voluntary budgeting to meet the costs of illness.

The medical profession has given of its utmost to the American people, not only in this but in every previous emergency. It has never required compulsion but has always volunteered its services in anticipation of their need.

The Committee on Economic Security, appointed by the President of the United States, presented in a preliminary report to Congress on January 17 eleven principles which that Committee considered fundamental to a proposed plan of compulsory health insurance. The House of Delegates is glad to recognize that some of the fundamental considerations for an adequate, reliable and safe medical service established by the medical profession through years of experience in medical practice are found by the Committee to be essential to its own plans.

However, so many inconsistencies and incompatibilities are apparent in the report of the President's Committee on Economic Security thus far presented that many more facts and details are necessary for a proper consideration.

The House of Delegates recognizes the necessity under conditions of emergency for federal aid in meeting basic needs of the indigent; it deprecates, however, any provision whereby federal subsidies for medical services are administered and controlled by a lay bureau. While the desirability of adequate medical service for crippled children and for the preservation of child and maternal health is beyond question, the House of Delegates deplores and protests those sections of the Wagner Bill which place in the Children's Bureau of the Department of Labor the responsibility for the administration of funds for these purposes.

The House of Delegates condemns as pernicious that section of the Wagner Bill which creates a social insurance board without specification of the character of its per-

sonnel to administer functions essentially medical in character and demanding technical knowledge not available to those without medical training.

The so-called Epstein Bill, proposed by the American Association for Social Security now being promoted with propaganda in the individual states, is a vicious, deceptive, dangerous and demoralizing measure. An analysis of this proposed law has been published by the American Medical Association. It introduces such hazardous principles as multiple taxation, inordinate costs, extravagant administration and an inevitable trend toward social and financial bankruptcy.

The Committee has studied this matter from a broad standpoint, considering many plans submitted by the Bureau of Medical Economics as well as those conveyed in resolutions from the floor of the House of Delegates. It reiterates the fact that there is no model plan which is a cure-all for the social ills any more than there is a panacea for the physical ills that affect mankind. There are now more than 150 plans for medical service undergoing study and trial in various communities in the United States. Your Bureau of Medical Economics has studied these plans and is now ready and willing to advise medical societies in the creation and operation of such plans. The plans developed by the Bureau of Medical Economics will serve the people of the community in the prevention of disease, the maintenance of health and with curative care in illness. They must at the same time meet apparent economic factors and protect the public welfare by safeguarding to the medical profession the functions of control of medical standards and the continued advancement of medical educational requirements. They must not destroy that initiative which is vital to the highest type of medical service.

In the establishment of all such plans, county medical societies must be guided by the ten fundamental principles adopted by this House of Delegates at the annual session in June 1934. The House of Delegates would again emphasize particularly the necessity for separate provision for hospital facilities and the physician's services. Payment for medical service, whether by prepayment plans, installment purchase or so-called voluntary hospital insurance plans, must hold, as absolutely distinct, remuneration for hospital care on the one hand and the individual, personal, scientific ministrations of the physician on the other.

Your Reference Committee suggests that the Board of Trustees request the Bureau of Medical Economics to study further the plans now existing and such as may develop, with special reference to the way in which they meet the needs of their communities, to the costs of operation, to the quality of service rendered, the effects of such service on the medical profession, the applicability to rural, village, urban and industrial population, and to develop for presentation at the meeting of the American Medical Association in June model skeleton plans adapted to the needs of populations of various types.

(Signed) HARRY H. WILSON, *Chairman*, California
WARREN F. DRAPER, Virginia
E. F. CODY, Massachusetts
E. H. CARY, Texas
N. B. VAN ETTEN, New York
F. S. CROCKETT, Indiana
W. F. BRAASCH, Minnesota

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CHANGES IN THE AMERICAN SYSTEM

Two years have passed since the last presidential inauguration. At the halfway mark, the country is in better poise and better morale, yet two years is a very short interval in a period of economic change and readjustment. An impartial observer lists the following

legislative developments which the Federal administration has already placed in effect or is proposing in legislation now pending.

1. Control of bank deposits and credit by a governmentally dominated board.
2. Government control of the issuance of paper money without permitting any of the gold backing to be used for redemption.
3. Control of all food businesses, all farms and handlers of products that come from the soil—everybody from the farmer to the retail grocer.
4. Government control of oil, coal, electricity, power and businesses derived therefrom; control of transportation, including railroads, busses, airways and merchant marine; regulatory control of telephones, telegraph and radio broadcasting.
5. Control, through the securities exchange commission, of the capital markets.
6. Government control of the relations between employers and employes.
7. Direct and indirect control of manufacturing and all other forms of business through the extension of the NRA system for another two years. As this is written, no official statement has been issued regarding the Federal government's plans for health insurance, although such plans are in the offing.

The future of the American system hangs in the balance as plans to establish state control are being placed before the representatives of the people in Congress for approval or disapproval.

If ever there was a time for the citizens of the country to tell Congress what they think about these far reaching changes, that time is NOW.

The Committee on Economic Security Studies Health Insurance

The Committee on Economic Security, in its report submitted to the President in January, indicated the difficulties inherent in a sickness insurance program. It offered the following information regarding the main points which it was studying:

1. The fundamental goals of health insurance are: (*a*) the provision of adequate health and medical services to the insured population and their families; (*b*) the development of a system whereby people are enabled to budget the costs of wage loss and of medical costs; (*c*) the assurance of reasonably adequate remuneration to medical practitioners and institutions; (*d*) the development under professional auspices of new incentives for improvement in the quality of medical services.
2. In the administration of the services, the medical professions should be accorded responsibility for the control of professional personnel and procedures and for the maintenance and improvement of the quality of service; practitioners should have broad freedom to engage in insurance practice, to accept or reject patients, and to choose the procedure of remuneration for their services; insured persons should have freedom to choose their physicians and institutions; and the insurance plan shall recognize the continuance of the private practice of medicine and of the allied professions.
3. Health isurance should exclude commercial or any other intermediary agents between the insured population and the professional agencies which serve them.
4. The insurance benefits must be considered in two broad classes: (*a*) cash payments in partial replacement of wage loss due to sickness and for maternity cases, and (*b*) health and medical services.
5. The administration of cash payments should be designed along the same general lines as for unemployment insurance and, so far as may be practical, should be linked with the administration of unemployment benefits.
6. The administration of health and medical services should be designed on a statewide basis, under a federal law of a permissive character. The administrative provisions should be adapted to agricultural and sparsely settled areas as well as to industrial sections, through the use of alternative procedures in raising the funds and furnishing the services.

7. The costs of cash payments to serve in partial replacement of wage loss are estimated as from 1 to 1.5 per cent of pay roll.

8. The costs of health and medical services, under health insurance, for the employed population with family earnings up to $3,000 a year, is not primarily a problem of finding new funds but of budgeting present expenditures, so that each family or worker carries an average risk rather than an uncertain risk. The population to be covered is accustomed to expend, on the average, about 4.5 per cent of its income for medical care.

9. Existing health and medical services provided by public funds for certain diseases or for entire populations should be correlated with the services required under the contributory plan of health insurance.

10. Health and medical services for persons without income, now mainly provided by public funds, could be absorbed into a contributory insurance system through the payment by relief or other public agencies of adjusted contributions for these classes.

11. The rôle of the federal government is conceived to be principally (*a*) to establish minimum standards for health insurance practice; and (*b*) to provide subsidies, grants or other financial aids or incentives to states which undertake the development of health insurance systems which meet the federal standards.

Resolution Adopted by the State Relief Administration for South Dakota

Resolved, that medical relief in the State of South Dakota from this date shall be handled as follows:

The relief administrator shall allow a fixed amount for medical aid in each county of the state based on the case load in each county from month to month as the emergency requires.

The State Relief Medical Advisory Committee and the State Relief Dental Advisory Committee shall nominate a committee in each county consisting of two physicians and one dentist. The said committee, if approved, shall be appointed by the state relief administrator.

The said committee shall audit all bills of their respective counties for the current month and recommend the amount due to each doctor and to each dentist for the current month out of the federal allotment to the county relief director. When their bills exceed the federal allotment, the bills shall be adjusted pro rata.

In the event there are cases that cannot be satisfactorily adjusted by such local committee, such cases shall be settled by the state administrator and the state medical director.

The existing relief fee schedule shall govern in all cases; any changes therein shall be made by the state relief administrator.

Where necessary, counties may be grouped by the relief administrator.

Omaha-Douglas County Central Health Service

The Omaha-Douglas County Medical Society made an investigation of the standards of eligibility for clinic medical care. This investigation naturally extended into programs for low income groups, and the investigating committee recommended that the county medical society establish a central health service. After a study of numerous similar experiments in other localities, the following tentative plan was recommended:

1. A central directing organization, to be known as the Omaha-Douglas County Central Health Service, shall be established for the purpose of assisting low income patients to obtain health service at a cost they are able to pay.

2. The personnel of this organization shall consist of a minimum of one full time executive secretary and one field worker, both of recognized standing in the field of medical social service, with necessary clerks and office headquarters.

3. The general policies of this organization shall be determined by a board of directors

constituted as follows: three physicians, two dentists, one hospital superintendent, one nurse and one pharmacist, to be appointed by their respective professional societies.

4. Direction of this central health service shall be by an executive committee of three appointed by the board of directors, two of whose members shall be physicians, each member to serve a term of three years.

5. The Omaha-Douglas County Health Council shall act as an advisory board to this central health service.

6. Patients shall be referred to the central health service only by physicians or welfare agencies of recognized standing, with preliminary medical and social survey to indicate the patient's health needs and lack of resources to provide for the total cost at regular prices.

7. The central health service shall confer with the patient so recommended, investigate further if necessary, and recommend a percentage reduction in medical fees and costs for services needed.

8. Members of the interested organizations rendering service will be expected to indicate their willingness to accept the recommendations of the central health service in percentage reduction of rates to be charged. Such charges will be billed at regular minimum rates, with the percentage discount indicated as recommended.

9. Collection of all charges shall be centralized in one office, with retention of 10 per cent by the central health service for operating expenses.

10. It shall be the obligation of the central health service to send patients who are unable to pay anything for private medical care to the teaching clinics of the city in rotation, or to the county clinic if not desired for teaching purposes. Exceptions are to be made to cases of recent private status when the attending physician makes a request to continue care of the patient without charge.—*J.A.M.A.*

Mail Your Suggestions and Reports on Dental Economic Subjects to the Secretary of the Economic Committee

Every one interested in the economic problems of dentistry, including health or sickness insurance, dental relief for indigents, dental care for children and dental services for the low income groups is invited to send to the Secretary of the Committee on Economics of the American Dental Association, 212 E. Superior St., Chicago, Ill., his opinions, suggestions, reports or statistics on these subjects.

British Doctors Unionize

"British doctors unionize in order that 'their hands would be strengthened in negotiations' with the British Government." This announcement comes from Dr. A. Welpy, Secretary of the Medical Practitioners Union of Great Britain, which is now a component of the Trades Union Congress.—*New York J. Dent.*, March, 1935.

Dr. Tugwell Addresses Midwinter Clinic

"The impulse in man to find security is as old as society itself, and in the long run will not be denied. In no respect is the fact more evident than as to the two forms of social security currently represented by old age pensions and health services."[1]

Dr. Tugwell painted a future in which any family could obtain the best medical, surgical, dental and hospital care without mortgaging income or running into debt.

"I am confident that in the future we shall establish this principle of paying for health in advance rather than in arrears," he said. "This is a part I feel has been overlooked by critics of institutionalized medicine."

Referring to the broad program of social security, Dr. Tugwell warned that a system

1. Extract from the speech of Rexford G. Tugwell, Under Secretary of Agriculture, given at the General Session of the Midwinter Clinic of the Chicago Dental Society, Feb. 19, 1935.

must be evolved suitable to the peculiarities of American temperament. He insisted that any program must assure the individual of "an income which will be a minimum bulwark against the unfriendliness of modern life."

Dr. Tugwell's statement that any program of social security must assure the individual of "an income which will be a minimum bulwark against the unfriendliness of modern life," bears repeating. This statement should be borne in mind at all times by all people in discussing social security. The economic conditions engendered by the five year world wide slump has caused rich and poor, scholar and dullard, to promulgate their pet plans to alleviate the ills of the world. To date, no practical, concrete, economically sound plan has been offered which the healing professions can adopt. We interpret Dr. Tugwell's statement to mean that each individual should be assured an adequate living wage, which should protect him and his family against want and all health. The trouble with such a plan is that its very simplicity opens it to ridicule.

CURRENT LITERATURE

Treatment of Epithelioma of the Cheek (G. E. Pfahler, Radiology, 24:99, 1935): Type, prognosis and etiology of epithelioma of the cheek are discussed and six cases reported. The individual history and treatment is given for each case. The treatment included excision, electrocoagulation and the use of radiation in the form of roentgen ray, radium packs and implants. The author concludes with a general discussion of the amounts of radiation recommended for treatment of this type of tumor of the cheek, but states that cancer cannot be treated by rule, but that each case must be considered individually.

GRANT VAN HUYSEN.

Fractures of the Jaw (R. H. Ivy, Surg., Gyn. and Obst., 60:531, 1935): Early reduction and fixation are of the utmost importance in preventing interference with function and visible disfigurement from fractures of the jaw. The principle in reduction is to restore the original occlusion of the teeth. In 90 per cent of the mandibular fractures, adequate fixation is obtainable by intermaxillary wiring. The teeth must be kept wired together for from four to six weeks, feeding being accomplished by tube without removal of any teeth. In many cases of unilateral fracture of the maxilla, the fragment need only be pushed back into place and the maxillary teeth on the sound side wired to the mandibular teeth. For bilateral maxillary fractures, a head apparatus and reversed Kingsley splint is recommended. Malar bone fractures need no fixation after reduction, but nasal bones may require fixation.

HAMILTON ROBINSON.

Trigeminal Neuralgia (T. Fay, Surg. Clin. N. A., 15:127, 1935): Trigeminal neuralgia may be differentiated from atypical neuralgia by the type of pain and attacks and the distribution. An interesting consideration is presented by the trigeminal nerve in that it turns its entire function over once in a lifetime with the change from deciduous to permanent dentition. The deciduous tooth nerve is considered to degenerate, but failure to do this and wandering of the terminal to distant points may result in a message of toothache being conducted to the brain. This may be a factor in trigeminal neuralgia and has an analogy in the sensations of toe injury sometimes felt by patients with amputated legs from pressure on the nerve bundle in the scar tissue. Surgical treatment, the procedure of choice, should be undertaken as early as possible. Alcoholic injection may be used if surgery is contraindicated.

HAMILTON ROBINSON.

Changes in the Teeth and Bones in

Chronic Fluoride Poisoning (C. J. Sutro, Arch. Path., 19:159, 1935): In addition to controls maintained on adequate calcium diets, four series of albino rats were administered various substances such as sodium fluoride (25, 50 and 75 mg.) with and without adequate calcium and combined with yellow phosphorus, sodium acid phosphates and parathyroid extract injections. Gross, histologic and roentgenographic examinations were made on the bones and teeth. Changes were found in the enamel and dentin of growing incisors after six weeks on 50 mg. doses of sodium fluoride per kilogram of rat; whereas, it took a period of a year or more with the same dosage to show bone matrix changes. Bone changes occurred without the intervention of osteoclasts. Roentgenographic examination of bones, with the exception of those cases on low calcium diet or receiving sodium acid phosphate, showed no osteoporosis. Animals fed sodium fluoride (50 mg. doses) for a period of a year or more showed increased density. Parathyroid extract neither retarded nor prevented the appearance of striped enamel.

GRANT VAN HUYSEN.

Fractures of the Bones of the Face and Skull (G. M. Dorrance and P. E. Loudenslager, Surg. Clin. N.A., 15:71, 1935): Malocclusion is the chief diagnostic sign of fractures of the jaw in which there is displacement. A cast intermaxillary splint, the so-called "gallery splint," is preferred in most cases to intermaxillary wiring. Occlusion of the teeth, not the alinement of the fragments, is the criterion of good reduction. Bone suturing and plating are condemned as productive of osteomyelitis. Maxillary fractures require less support than mandibular because of the relative freedom from muscle stress in the former. The malar bone rarely requires support after reduction. In cases wherein the nasal bones require fixation, appliances with pins piercing the skin and exerting pressure only on bone are preferable.

HAMILTON ROBINSON.

Malignant Disease of the Mouth, Pharynx and Larynx. Five Year Cures (G. B. New and F. A. Figi, Surg., Gyn. and Obst., 60:483, 1935): Five year cures are reported for 745 cases treated by surgical operation, surgical diathermy and radiation. Of 118 patients treated for upper jaw and palate malignancy, 63.7 per cent lived over five years after. Similar five year cures are reported for 28.9 per cent of thirty-eight cases of lower jaw malignancy with node involvement, 69.9 per cent of 113 cases of lower jaw malignancy without node involvement, 75 per cent of 476 lip epitheliomas, 37.2 per cent of 156 tongue epitheliomas, 57.9 per cent of seventy-six cases of pharynx and tonsil malignancy and 64.5 per cent of 107 carcinomas of the larynx.

HAMILTON ROBINSON.

Device for Protection of the Teeth During Bronchoscopy and Esophagoscopy (S. Israel., J.A.M.A., Feb. 9, 1935): Flexible rubber tooth guards have been devised to fit over the upper teeth against which the instrument rests and presses often causing soreness of days' duration. The old method of protection was the operator's thumb or a pad of gauze or cotton. The one removed a hand from service and the other slipped from place and obstructed the view.

T.

What Should a Patient with Arthritis Eat? (Walter Bauer, J.A.M.A., Jan. 5, 1935): Looking over diets prescribed for arthritic patients, the author concludes that diets vary from patient to patient and that there is no unanimity of opinion concerning the correct diet for an arthritic patient. First of all, a physician must determine whether the patient has arthritis and then the type. He lists the types of joint diseases. Arthritis of known and unknown or uncertain origins are discussed, and diets, acid fruits and vegetables, faddists' diets, acid-base balance, low protein diet, reduced calory intake and carbohydrate restriction. He concludes that there is no specific diet for patients with arthritis of known origin with the exception of gout. In degenerative arthritis, attention to diet is indicated only when obesity occurs. There is no evidence that a low carbohy-

drate diet is indicated in rheumatoid arthritis, nor is there proof that it is efficacious in curing the disease. Such patients, unless overweight, should eat a diet high in calories and vitamins and adequate in calcium, phosphorus and iron.

T.

Vitamin G Content of Home Canned Tomato Juice (C. F. Poe and Esther L. Gambill, J. Nutrition, Feb. 10, 1935): Disagreement as to the vitamin G content of tomatoes is shown by the work of Hartley, Daggs and Eaton, Goldberger and Wheeler. The investigation of Poe and Gambill gives the quantitative determination of the water soluble, growth-promoting factor other than vitamin B in home canned tomato juice. Thirteen samples of home canned tomato juice were assayed for vitamin G. The average content per cubic centimeter has been found to be a 0.21 unit.

T.

Vitamins A, D and B in Oysters. Effect of Cooking upon Vitamins A and B_1 (Dorothy V. Whipple, J. Nutrition, Feb. 10, 1935): Because the oyster is one of only a few animals that are eaten whole and because the visceral parts of animals usually contain larger vitamin reserves than the muscle meat, this study was undertaken. *Ostrea virginica* was used. The work is summarized as follows: "The vitamin A content of oysters taken from the beds in October was found to be approximately 3 U.S.P. units per gram. Assuming that all of the vitamin A is in the fat of the oyster, oyster oil contained 208 units per gram. There was a slight destruction of vitamin A during cooking. The vitamin D content of oysters harvested in the fall was found to be approximately 0.05 U.S.P. unit per gram. Assuming that all of this vitamin is also in the fat of the oyster, the oyster oil contained 3.4 units per gram. The discrepancy between rat units of vitamin D and antirachitic potency for children is emphasized. The vitamin B (B_1) content of oysters was found to be approximately 1.5 Sherman units per gram. There was no appreciable destruction during cooking. Oysters were found to be an excellent food source of vitamin B(B_1), a relatively good one of vitamin A and a very modest source of vitamin D.

T.

Cevitamic Acid in the Treatment of Infantile Scurvy (A. F. Abt and I. M. Epstein, J.A.M.A., Feb. 23, 1935): Two cases were treated at the Children's Memorial Hospital through the courtesy of Dr. Joseph Brennemann. Irene P., aged 1 year, was referred to the hospital from the outpatient department with a diagnosis of scurvy, Oct. 24, 1934. The essential physical changes were spongy, purple, bleeding gums about the erupted teeth, extreme tenderness of both legs, and some general swelling of the right leg. She had never had orange juice or tomato juice. Her entire diet prior to admission was a formula consisting of evaporated milk, water and Karo syrup and farina. The mother stated that until recently she had always had a boiled cow's milk formula. She had had small amounts of cod liver oil between the second and fifth months of life. The history of the present illness dated back two months, when the soreness of her gums was first noticed. For the last two weeks she had cried whenever she was touched. The remainder of the history and physical examination was essentially negative. There was no anemia. The hospital diet was an evaporated milk, water and Mellin's food formula. Twenty milligrams of cevitamic acid were given orally each day for the first four days. After that, 40 mg. was given daily for ten days. There appeared to be less tenderness after twelve hours. There was definitely less tenderness and less swelling of the gums in twenty-four hours. After eight days, the only remaining clinical evidence of the scurvy was the discoloration of the gums. Roentgen examination of the bones, October 25, was typical for scurvy. No subperiosteal hemorrhages could be identified. Stella R., aged 9 months, was referred to the hospital from the outpatient clinic, Oct. 24, 1934, with the diagnosis of scurvy, aphthous stomatitis and laryngitis. The

essential changes on admission were swollen, purplish spongy gums about the erupted teeth, hoarseness, and aphthous stomatitis. There was no localized tenderness. The stomatitis and hoarseness had been noticed six days previously. The other physical and laboratory examinations were negative except for hemoglobin 55 per cent, red blood cells 3,200,000 and blood calcium 9.3 mg. per hundred cubic centimeters. She had been on a diluted cow's milk formula since 1 month of age. One teaspoonful of orange juice a day had occasionally been given. No cod liver oil was used. She was given 20 mg. of cevitamic acid orally each day for four days, then 40 mg. daily for ten days. In two days, the gums were less swollen and purple. Four days after admission there was practically no swelling of the gums. In eight days, there was only slight discoloration. The hoarseness persisted throughout and was still present one month later. Roentgen examination of the long bones, October 25, was typical for scurvy. No subperiosteal hemorrhages were noted.

Dental Decay in a Child: I have a patient, a girl 10 years of age, who has lost three permanent molars within the last six months because of crumbling followed by decay. She appears to be a normal, healthy child and her only visible abnormality is that she is about 20 pounds (9 kg.) overweight, weighing about 88 pounds (40 kg.). She is a member of one of the better families and has a nourishing diet and takes excellent care of her teeth. I have thought of a lack of vitamins and have given her various cod liver oil and haliver oil preparations. I also am trying to reduce her weight to normal by a simple reduction in diet. Any advice you can give me to arrest the brittleness and crumbling of this child's teeth will be greatly appreciated.

Brittleness and crumbling followed by decay of the molars of a 10-year-old child can be interpreted only as a type of decay beginning in deep pits and fissures of the enamel of the occlusal (chewing) surfaces of the teeth. This form of decay usually penetrates the enamel through a small opening and spreads rapidly through the dentin, undermining the enamel crown and causing it to become brittle and to crumble. Dentin containing many interglobular spaces, undercalcified zones, is considered to be associated with rickets, a disease that is likely to occur at the same time as the development and calcification of the first permanent molars. After the teeth are fully formed and erupted, little can be done to change their character or to harden the enamel or improve the quality of the dentin. Vitamin D administered at the time of the formation of the teeth affects the process of calcification favorably but appears to have little or no effect in this sense after eruption.—*J.A.M.A.*, Jan. 26, 1935.

Stains on Teeth: The upper central and lateral incisors of a girl, aged 3½ years, in excellent health, have become decidedly black. The parents and curiously the child are much concerned about it. The only article of food she dislikes and rebels against is milk; otherwise she is on a general diet. A scholarly dentist who examined her maintains that nothing can be done to check this condition of a jet black discoloration. It occurs to me that the condition is evidence of an unbalanced diet or certain type of vitamin deficiency or some systemic aberration. Regardless of what the underlying factors may be, the selective tendency for the upper teeth favors a local rather than a systemic etiology. If this is a vitamin deficiency, how may this elective localization be explained? Your discussion of the etiology and method of procedure to combat this condition will be greatly appreciated.

In general, as Bunting says, "stains on teeth have no pathologic significance other than they indicate a relative degree of malhygiene and give to the mouth an unsightly appearance." With respect to black stain or discoloration, this is only partly true, since a black stain may be found in mouths that have excellent care, and general discoloration of a tooth is frequently suggestive of death or advanced degeneration of the pulp. Little is known about the black stain that is superficial on the lateral sur-

faces of teeth or is close to the gum line, except that it is removed with ease and tends to recur from deposits containing iron, silver, mercury or other metals. Deep discoloration of a whole tooth, as a rule, is caused by changes in the pulp. Mottled enamel is sometimes black but is not found in temporary teeth. Since the teeth involved in this case are temporary teeth that will be lost comparatively early, no form of radical treatment is indicated unless frank pathologic changes can be demonstrated. The pulps should be tested for vitality. Roentgenographic examination may be made, although it is unlikely that additional information will be gained in this way. Since vitamins, diet and systemic disease have not been connected with this condition, the patient's limited consumption of milk and general health are not significant, and the treatment, in the absence of any further information as to the etiology of the discoloration, is confined to cleaning and polishing the visible surfaces of the discolored teeth.—*J.A.M.A.*, Jan. 12, 1935.

Ulcerative Colitis: II. The Factor of Deficiency States (Thomas T. Mackie, J. A.M.A., Jan. 19, 1935): The author discusses ulcerative colitis as a factor of deficiency states. The diagnostic criteria adopted in his observations are restricted to the objective changes that occur in various deficiency states. They express themselves particularly in the mucous membranes of the mouth, in the skin, in change in the chemical elements of the blood and associated anemia. Alterations in the mucous membrane of the tongue are the most common manifestations of deficiency disease. The initial phase begins as an inflammation of the fungiform papillae over the anterior third giving a strawberry-like appearance. The inflamed tongue is red and tender. Small aphthous ulcers may appear and be present also on the buccal mucosa. The filiform papillae degenerate as in sprue, and smooth atrophy of the tongue results. These changes are slight at first and may easily escape notice. In forty-seven cases, indications of deficiency disease were present on the tongue (forty-seven cases), buccal mucosa (four cases) and skin (eleven cases), in blood changes (seven cases), as anemia (forty cases) and as peripheral neuritis (seven cases). The author concludes that deficiency disease constitutes an essential part of the underlying mechanism.

Foot and Mouth Disease—Bacillus Xerosis: About ten months ago, I had a patient, a white boy, aged 15 years, who gradually became ill with what appeared to be an ordinary pharyngitis, lasting for three or four days without fever. About the fourth day, he complained of more soreness in his throat, extending out into his mouth, gums and tongue. Examination at this time showed superficial ulcerations scattered over the pharynx and fauces. (The tonsils had been removed completely.) The entire mucous membrane of the cheeks, gums and underneath the tongue was covered with a gelatinous gray pseudomembrane. Cultures from the mouth, throat and nose were at first reported as positive for diphtheria, but further study showed the organisms almost a pure culture of *Bacillus xerosis*. Since he had already been ill five or six days at the time of the positive diphtheria report, he was given 40,000 units of diphtheria antitoxin, after which the membrane began to separate, leaving ulcerated areas where it had been. There followed a period of several days during which there was a profuse thin, colorless, irritating secretion from the mouth necessitating his turning his face to the side so that the secretion could run out on a towel. There had also been involvement of the eyes, nose and external urethral meatus. Recovery was gradual over a period of about ten days. This boy has now presented himself with a condition resembling the onset of the illness, and a similar membrane is just appearing on the inside of the cheeks. Cultures from the throat have been taken but not reported on as yet. A search of medical literature available to me fails to disclose such a clinical picture by *Bacillus xerosis*. I would appreciate any information you can give me about this condition, especially as regards treatment.

There is much in the picture given that suggests foot and mouth disease, but no mention is made of the usually associated cutaneous lesions. The association with diseased cows or goats or the use of milk, butter or cheese from sources where foot and mouth disease is present might aid in the diagnosis. Naturally, the action of irritating agents taken into the mouth must be considered. The xerosis bacillus is one of a considerable group of bacteria found on normal and diseased mucous membranes and usually spoken of as pseudodiphtheria bacilli or diphtheroids. They are not believed to be pathogenic. The treatment should be cleansing with milk, nonirritating washes. Ulcerations may have applications of silver nitrate.—*J.A.M.A.*, Jan. 19, 1935.

Effect of Overdoses of Irradiated Ergosterol, Administered for Approximately Two Months, on the Composition and Structure of the Bones of Rats (J. H. Jones and G. M. Robson, Am. J. Physiol., February, 1933): The bones of rats which were given a sufficient amount of viosterol to produce death after a period of from six to eight weeks showed marked porosity due to the removal of organic as well as inorganic matrix—apparently, as the result of osteoclastic activity which was shown by histologic studies. The bones were soft and fragile; chemically there was a relative decrease in the ash content, which was apparently caused by the growth of osteoid tissue following the absorption of the bone matrix.—*Am. J. Dis. Child*, January, 1935.

Physical Defects Commonly Found Which Influence Nutrition and Which Admit of Correction (A. H. Parmelee, Illinois M. J., January, 1934): Some of the common physical defects which influence nutrition are: (1) physical defects which mechanically interfere with the taking of food, such as carious teeth, improper occlusion and nasal obstruction and (2) physical defects which directly or indirectly are responsible for a poor appetite, such as nasopharyngeal discharges, nasal obstruction, defects of vision, defects which interfere with normal locomotion and infections. Parmelee points out that the correction of these defects alone may not be sufficient to effect an improvement in nutrition at this stage, for the disturbed nutrition, if of long standing, has caused damage to many tissues and organs of the body.—*Am. J. Dis. Child*, January, 1935.

Calcium and Phosphorus Studies: VII. The Effects of Variations in Dosage of Calcium and Phosphorus in the Diet on the Concentrations of Calcium and Inorganic Phosphorus in the Serum and on the Histology and Chemical Composition of Bones of Rats (David H. Shelling, Dorothy E. Asher and Deborah A. Jackson, Bull. Johns Hopkins Hosp., December, 1933): The effects of parathyroid extract on the bones of young rats vary with the dose of the hormone and the calcium and phosphorus content of the diet. In animals fed the stock diet, parathyroid extract administered in amounts as high as 10 units daily for a rat weighing from 50 to 60 gm. produces hyperostosis, while in amounts of 20 units it induces osteodystrophia fibrosa. In animals fed rachitogenic diets, the parathyroid extract fails to prevent rickets, but stimulates osteoblastic activity and trabecular proliferation. In rats fed "border line" rachitogenic diets, the extract stimulates cartilaginous proliferation as well as increased trabeculation. In animals fed optimal calcium-high phosphorus diets, fibrosis occurs with a relatively lower dose of the extract than on the stock diet. Injections of parathyroid extract evoke moderate hypercalcemia and hyperphosphatemia in the rat; the hyperphosphatemia, however, depends on the dose of the hormone and the intake of phosphorus. In animals fed the stock diet, larger doses of the extract increase the serum inorganic phosphorus nearly 100 per cent, but in those fed the rachitogenic diet the serum inorganic phosphorus remains at rachitic levels. In one group of animals fed a diet low in calcium and phosphorus, which were given injections of 10 units of the extract daily, the serum calcium was 5.3 and the inorganic phosphorus 14.3 mg. per hundred cubic centimeters. In spite of the hypocalcemia and hyperphosphatemia, there

was no clinical evidence of tetany. Analysis of the percentages of ash, calcium and phosphorus of the dry extracted femurs indicated certain dissimilarities between the osseous hypercalcification due to feeding vitamin D and that induced by the parathyroid extract. The former increased the deposition of lime salts in the existing organic matrix so that the ratio of ash to organic matter was increased, whereas the parathyroid extract first stimulated trabeculation, and the calcification that followed did not exceed the production of organic matrix; hence the ratio of ash to organic residue was not increased, and was actually diminished if fibrosis and osteoid tissues were also present. The injection of large doses of parathyroid extract into young suckling rats resulted in proliferation of cartilage, delayed ossification of the epiphyseal centers and decalcification and fibrous replacement of the metaphyses, but not typical rickets. Large doses of the extract produced lesions of the skin resembling scleroderma in 10-day-old suckling rats. These lesions, however, were absent in older rats so treated. Metastatic calcification occurred only when the doses of the extract were very high and when the bones were markedly decalcified. Certain discrepancies in the literature as to the effect of parathyroid extract on the rat were discussed, and the divergent results are explained as possibly due to variation in: (1) the age of the animals, (2) the dietary calcium and phosphorus and (3) the dose of the hormone.—*Am. J. Dis. Child.,* January, 1935.

Treatment of Diphtheria: At a November meeting here, the treatment of diphtheria was discussed by some of the leading clinicians and bacteriologists of Paris. Louis Martin, director of the Pasteur Institute, made an appeal for the use of antitoxin at the earliest possible moment, and not to wait for the appearance of false membranes. Intravenous injection acts more rapidly than intramuscular, and the latter more rapidly than subcutaneous. The opinion was unanimous as to the size of the doses; i.e., not more than 200 c.c. (50,000 units) altogether; for a child of 10, 80 c.c. is given the first day, 60 c.c. the second and 40 c.c. the third. Debré did not believe that the antitoxin had lost its merited reputation, but it failed to cure malignant cases because employed too late. The physician should not wait for laboratory reports before using the antitoxin. The reports either arrive too late or may be wrong, not showing the specific bacilli when the disease is already present or revealing the presence of short bacilli, so that valuable time is lost. The clinical examination should be the attending physician's guide. Local applications are useless. When a child who has been vaccinated against diphtheria shows evidences of the disease, the antitoxin should be administered the same as though no vaccination had been performed. There are a small number of children who cannot be immunized by vaccination. Marfan and Debré did not think that antitoxin was of any avail in paralysis, but Lereboullet and Martin did not agree with this view.—Paris Letter, *J.A.M.A.,* Jan. 19, 1935.

No Foot and Mouth Disease in United States: In Queries and Minor Notes in *The Journal,* January 19, page 239, in the reply to M.D., Alabama, concerning a boy affected with a throat and mouth trouble, the statement is made that "the association with cows and goats or the use of milk, butter or cheese from sources where foot and mouth disease is present might aid in the diagnosis." The fault of this statement lies in the fact that foot and mouth disease does not exist in the United States, and it could not exist in Alabama or elsewhere in this country without bringing great headlines in the newspapers and an army of disease fighters to the scene without an hour's delay. Foot and mouth disease is one of those sweeping animal plagues that leave no doubt of their presence. Foot and mouth disease has broken out in the United States several times during the last fifty years, but each time it was promptly stamped out. The vigil against it is constant. In view of the wide foreign circulation of *The Journal,* this remark by one so highly rated in the medical profession does an injustice to the veterinary service of the

United States and can do incalculable harm to our struggling live stock industry. It implies that this grave plague exists among the domestic animals of the United States, notwithstanding official declarations to the contrary.—*J.A.M.A.*, Feb. 23, 1935.

Dental Caries: A certain family in my practice has three children, all of whom have teeth susceptible to early decay. The ages are 9, 8 and 6, respectively. They are representatives of the better class and their food is adequate in every respect. Only one indulges too much in sweets. Their teeth get constant personal and professional care. The mother has been advised by her dentist to use a proprietary combination of calcium phosphate and viosterol. As these children all drink an abundance of milk, I have told her that this is useless. She wants to know what can be done to prevent bad teeth in her children. These youngsters are above average in health and nutrition, although all three are asthmatic or potentially so. Is there any indication for calcium therapy when milk ingestion is ample? Could you suggest any method or treatment for this type of case?

A large amount of scientific evidence has of recent years accumulated which indicates that dental caries is essentially a dietary deficiency disease. Experiments carried out in orphan institutions where the complete diet was strictly under control show that the frequency of dental caries rises and falls with the increase or decrease of carbohydrates in the diet. In a small percentage of children caries was completely inhibited; in approximately 90 per cent of all the children the caries prevalence was markedly reduced, and in only a small percentage of cases did diet, apparently controlled, manifest no inhibiting influence. In still other cases it has been shown that some children remain immune, no matter how unbalanced the diet. An adequate diet should be diversified, with a well balanced calcium-phosphorus ratio, along with a goodly amount of vitamins D and C. While diet must be regarded as the one most important factor in susceptibility to caries, it is by no means the only one. Others are heredity, the glands of internal secretion, mechanical factors and oral hygiene. The significance of heredity and the glands of internal secretion are today but little understood. Irregularly occluding teeth are more frequently carious than those in normal occlusion. Oral hygiene is important only as far as caries is concerned in those individuals who are susceptible. Whenever *Bacillus acidophilus* is present in the mouth, caries also is found; without its presence, caries is never found. Even the most careful mouth hygiene cannot completely prevent caries when conditions of the mouth are favorable to the existence of *Bacillus acidophilus*, but it can materially limit its activity. The condition that permits *Bacillus acidophilus* to live in some mouths and not in others is not known, but it is assumed to be systemic. The glands of internal secretions may, of course, be responsible; their abnormal as well as normal functioning may be affected by diet. In regard to these three children, the diet should be knowingly and dependably regulated. This is difficult to do in private families. The diet should contain at least a gram of calcium daily. Alkaline fruits and vegetables should be given preference to acid cereals. In addition, the meal should be ended with some hard food substance to exercise the jaws and cleanse the teeth mechanically. Eating between meals, if any, should be restricted to fruits. If results are still unsatisfactory, the glands of internal secretion should be suspected. The fact that these children are actually or potentially asthmatic suggests disturbed calcium metabolism. The glands are again assumed to be responsible. The administration of calcium and phosphorus is of doubtful value; if the diet is diversified, it usually contains ample amounts of these. The difficulty lies in the direction of improper assimilation.—*J.A.M.A.*, Feb. 16, 1935.

Foreign Literature

Presence of Streptococci in Apical Granulomas (W. Blemenberg and A. Zull, Arch. f. Hyg., February, 1933): Fifty-four apical granulomas were studied.

Hemolytic streptococci were found in 50 per cent of the cases. The striking difference between these results and those of other investigators probably depends on the methods used. Geographic location and climate are probably factors, but their evaluation is difficult. The usual opinion that hemolytic streptococci are present only in granulomas manifesting clinical symptoms is wrong. Hemolytic streptococci, usually in mixed culture, may be present independent of the clinical form of the granuloma. These latent foci of streptococci infection should be eliminated. All the evidence indicates that septic conditions of dental origin are far more frequent than is generally supposed.—*Am. J. Dis. Child.*, January, 1935.

Use of Sodium Citrate in Hemophilia: At a recent session of the Vienna Medical Society, Dr. Schürer reported the good results that he had seen in grave hemorrhages following extractions of teeth from the use of a combination of blood transfusion with subcutaneous injection of a 3.5 per cent solution of sodium citrate. Also in other cases of grave hemorrhages from the kidney, following traumas, this medication offers in hemophilia the best prospects for a prompt control of the bleeding. The effect is brought about by a reduction of the usually lengthened coagulation period. The normal coagulation period is from four to eight minutes, but in the cases that he studied, Schürer observed before the injection, twenty-one, after the injection, sixteen, and on the day of the transfusion, thirteen minutes. A blood transfusion should be combined with the sodium citrate. The speaker introduced a man, aged 34, who was known as a hemophiliac subject and in whom, following a tooth extraction, a grave submucous bleeding in the mouth and a hematoma of the face developed. In spite of all the various preparations applied, the hematoma assumed huge proportions and dyspnea appeared. After a venesection of 800 c.c., a transfusion of 600 c.c. was given and the sodium citrate was injected daily. The effect was excellent. From 10 to 20 c.c. should be injected once a day—with children one may begin with 5 c.c.—but always combined with a blood transfusion. Blood transfusion appears to be the sovereign remedy in hemophilia, but its effects are greatly enhanced by a preceding injection of sodium citrate.—Vienna Letter, *J.A.M.A.*, March 2, 1935.

The Preschool Child (M. J. Australia, Dec. 23, 1933): Children need individual attention during the preschool period, and their welfare cannot be best promoted by group examinations in summer "round-up" or similar clinics. The problems of each child are complicated and are best handled by the general practitioner in the seclusion of his consulting room. As the public is not sufficiently aware of the dangers of this age period in regard to malnutrition, deficiency diseases, infectious diseases, diseased tonsils and adenoids, carious teeth, abnormalities of the eyes, defects of speech, emotional and behavior problems and other disorders, the medical profession should make an organized effort to teach parents the necessity of seeking advice for preschool children at regular intervals.—Abstr. *Am. J. Dis. Child.*, February, 1935.

Localized Osteitis Fibrosa of the Superior Maxilla (G. Kriegsmann, Arch. f. Ohren-, Nasen- u. Kehlkopfh., Nov. 14, 1933): Kriegsmann calls attention to the fact that osteitis fibrosa, which usually assumes a generalized form, may rarely be localized in the skull, especially in the maxilla. He reports a case of osteitis fibrosa of the maxilla in a girl, aged 15, in whom no osseous changes appeared in the rest of the skeleton. The patient exhibited swelling of the right cheek, which had developed gradually during the six months preceding the examination. The swelling was most severe 2 fingerbreadths from the right nostril. The soft parts were not edematous, red or sensitive to pressure and were mobile. The corpus of the maxillary bone protruded toward the front. In the canine fossa, there was a smooth protuberance extending from the first bicuspid to the second molar. A roentgenogram of the nasal sinuses showed a strong, even clouding in the region of the right maxil-

lary sinus. Introduction of fluid into the sinus could not be accomplished because of strong resistance. In a typical operation on the maxillary sinus, performed because of a tentative diagnosis of osteosarcoma, it was found that the space usually occupied by the maxillary sinus was filled with spongy bone, which was continuous with the walls of the sinus. The soft spongy bone was removed to form an opening the size of a normal maxillary sinus. Microscopically, the excised bone showed nothing suggestive of sarcoma, but presented a regular proliferation of osteoid tissue and active transformation characteristic of osteitis fibrosa. No exacerbation of the patient's condition has occurred in the four years since operation. Differentiation between osteitis fibrosa and osteosarcoma is possible only by microscopic examination. —Abstr. *Am. J. Dis. Child.*, February, 1935.

Agranulocytic Angina (J. H. Fisher, Lancet, Dec. 1, 1934): The author presents two cases of typical agranulocytic angina that were admitted to the hospital as cases of diphtheria. The first patient was found to have a terminal pneumococcic septicemia. Agranulocytic angina developed in the other patient while in the hospital. Although suffering from diabetes, her condition was good and she was getting up each day. While there she had one tablet of allylisopropylbarbituric amidopyrine daily for seventeen days and 5 grains (0.3 gm.) of soluble barbital for two days. Her symptoms commenced on the seventeenth day, when she was transferred to another hospital. Apart from an occasional tablet of acetylsalicylic acid, she had taken no drugs prior to this. In the first case, no drugs of any kind were being taken prior to the onset of symptoms. It therefore belongs to that category of cases in which no etiologic factor can be determined. The author was unable to obtain pentnucleotide in time for treatment, as both patients died fifteen and twenty-three hours, respectively, after admission. Both patients showed a complete absence of polymorphonuclear leukocytes and few myelocytes but numerous myeloblasts. The changes found were similar to those described by Fitz-Hugh and Krumbhaar, who put forward the hypothesis that the myeloid hyperplasia is due to a "primary maturation arrest" rather than to a "primary aplasia," and pointed out certain analogies to pernicious anemia. In hemorrhagic purpura, the bone marrow may show either megakaryocytic hyperplasia or aplasia. Hubble suggests that there is one variety of agranulocytic angina and one variety of hemorrhagic purpura allied to aplastic anemia. In the last, there is a circulating anemia in spite of proliferation of the megaloblast, hyperplasia of the megakaryocytes with a peripheral thrombocytopenia, and a myeloid hyperplasia with a peripheral agranulocytosis.—Abstr. *J.A.M.A.*, Feb. 16, 1935.

Secondary Effects of Amidopyrine (H. Lotze, Med. Klin., Dec. 7, 1934): Lotze studied cases of acute and chronic polyarthritis, which had been treated with amidopyrine, for the appearance of undesirable secondary manifestations. He observed five cases in which amidopyrine caused inhibition of diuresis and impairment of the excreting renal tissues. These changes proved reversible. He observed one patient, in whom a lethal amidopyrine intoxication developed with signs of general intoxication and of impairment of the central nervous system. He thinks that in this case especially predisposing factors were responsible for the unfavorable action of amidopyrine. He believes that the occasional appearance of more or less severe intoxications in the course of prolonged treatment with comparatively large doses is no reason to dispense with the use of a medicament as effective as amidopyrine in the treatment of polyarthritis.—Abstr. *J.A.M.A.*, Feb. 16, 1935.

Uveoparotid Tuberculosis (S. E. Tanner and A. L. McCurry, Brit. M. J., Dec. 1, 1934): Tanner and McCurry present three cases of uveoparotid tuberculosis. In the first, uveitis and unilateral parotitis were accompanied by facial paresis, optic neuritis, dysphagia and palatal paresis. Mediastinal adenitis, probably tuberculous in nature, was demonstrated. In the second case uveitis and bilateral parotitis and left

sided facial paresis occurred. A biopsy of the parotid gland gave definite evidence of tuberculosis and there was also evidence of the same infection in the lungs. The third case showed extensive uveitis in both eyes, leading to blindness in one, unilateral parotitis and facial paresis; there was a family history of tuberculosis and roentgen evidence of chronic pleurisy. The authors state that when death occurs, it is due to miliary tuberculosis. Their statement is based on the only three necropsies reported. An interesting feature of two of these, Souter's and Garland and Thomson's, was the presence of tuberculosis of the cardiac musculature. The authors were unable to demonstrate by clinical or electrocardiographic investigation any such involvement in their cases.—Abstr. *J.A.M.A.*, Feb. 23, 1935.

Operative Treatment of Facial Palsy (A. B. Duel, Brit. M. J., Dec. 1, 1934): Duel urges immediate investigation of the site of accidental injury in cases of facial palsy. In many instances, the removal of a spicule of bone, the lifting of a fractured plate of bone, the decompression and cleansing of 10 mm. or more of nerve with a slitting of the sheath to relieve inflammatory pressure will ensure an almost perfect recovery, when neglect would be followed by only partial recovery, with grotesque disfiguration for life. When such an investigation reveals the fact that there is an actual section of the nerve or extensive damage, a preliminary incision of the femoral cutaneous nerve may be done immediately and, two or three weeks later, a graft may be transplanted from this to replace the gap. In such a case, for from forty-eight to seventy-two hours after the initial injury, one will have the advantage of being able to pick up the distal segment and verify it by faradic stimulation and will know something of the problem to be faced in making the transplant later on. No matter what the length of graft necessary in such cases, recovery is assured if the graft is transplanted successfully. Operation in cases of long standing is indicated whenever there is galvanic response in the muscles sufficient to show that the muscles have not undergone too much fibrous atrophy. The nerve can always be repaired. If there is sufficient muscle fiber left, the case will be greatly improved. The quality of the result will always depend on the condition of the muscle: the time element enters largely into this. The author has incised the sheath of the nerves in several cases of Bell's palsy in which the recovery was incomplete and had remained unchanged for many years. In every instance, despite this long period of inactivity, the relief of the pressure by incising the sheath of the nerve has resulted in a marked improvement. He presents four recent cases.—Abstr. *J.A.M.A.*, Feb. 23, 1935.

Research on the Pathogenesis of Radicular Cysts (H. Hammer, Deutsche Zahn.-Mund-u. Kieferhlk., Nov. 1, 1934): The author agrees with Partsch's ideas about chronically granulated periodontitis. The chronic inflammatory processes limit themselves at first to the apical soft structures, and then they spread widely into the underlying and surrounding bone. The epithelium of the radicular cyst arises exclusively from Malassez's epithelial rests. Deviating reports show merely complications, which do not touch the essence of this question. From all the theories about the formation of radicular cysts only those are true that state that there occurs an epithelization in the already formed hollow space in the granulation structure. Only chronic abscesses are the causes of the preforming hollow spaces.

OSCAR KARPF.

Hereditary Influences of Isolated and Symmetrically Missing Cuspids in Permanent Dentition (G. Schweitzer, Deutsche Zahn.-Mund-u. Kieferhlk., Oct. 1, 1934): The author describes: 1. A case of nonformation of all four cuspids in a fully formed dentition (the first one in this case). 2. A case of nonformation of both upper cuspids in a fully formed exceptionally strong dentition (the first one in this case). Cases 1 and 2 disprove the present beliefs that the absence of cuspids is often

related to a decrease in the number of the remaining teeth. The author reviews the possible causes for the manifestations of the missing cuspids. The symmetrical absence of cuspids in the foregoing cases may possibly be due to heredity, either through a gene with a weak penetration or a recessive strong gene, or it may be due to the presence of a new mutable hereditary factor. As further proof for an hereditary etiology, the author gives (1) the presence of transmission of Darwin's protuberance of the ear muscle in four generations of the family in one of the cases; and (2) the transmission of a supernumerary peg-shaped tooth in three generations. In both cases, the dominant hereditary succession occurred in alternating sexes. The author further discusses the various possibilities of hereditary succession, mutation and the significance of the "weak" gene. In conclusion, he points out the genetic importance of the variety of the deciduous and permanent teeth and their value for further research.

OSCAR KARPF.

NEWS

CALIFORNIA

Bills Introduced: A. 1037 proposes to make it unlawful for any person to own, possess or operate any x-ray device or x-ray laboratory unless such device or such laboratory is operated under the direct supervision of a person licensed by the state board of health. Apparently, only licentiates of the board of medical examiners, licensed osteopaths and licensed dentists are to be eligible for licensure by the board of health. Such practitioners are to be permitted to possess and use such devices "as are incident to the treatment of patients by means other than x-ray or x-ray devices."

A. 990, to amend the dental practice act, proposes to define the following acts as unprofessional conduct, in addition to the acts now specified by law: (1) advertising of a character tending to deceive or mislead the public; (2) advertising professional superiority; (3) advertising fixed prices for services; (4) advertising by means of any sign containing the representation of a tooth, bridgework or any portion of the human head; (5) employing advertising solicitors or press agents; (6) advertising free dental work or free examination; (7) advertising to guarantee any dental service, and (8) advertising to perform any dental operation painlessly. S. 499, to amend the dental practice act, proposes to authorize courts on the application of the board of dental examiners to restrain the unlicensed practice of dentistry.

CONNECTICUT

Bill Introduced: H. 848 proposes to prohibit the retail sale or other retail distribution of barbital and other hypnotic or somnifacient drugs, except on the prescription of a licensed physician, dentist or veterinarian. The prohibited drugs are barbital, malonylurea, sulphonethylmethane (trional), sulphonmethane (sulphonal), diethylsulphone, diethyl-methane (tetronal), paraldehyde and chloral or chloral hydrate or chlorbutanol.

Gift for Support of Dental Research at Yale University: A grant of $17,500 has been made by the Carnegie Corporation of New York to Yale University for the support of dental research in the School of Medicine during the coming year, according to an announcement made by President James Rowland Angell. This gift makes possible the continuance of a program launched six years ago to promote the scientific study of the teeth and to stimulate the interest of physicians in the rôle played by the teeth in health and disease. The

dental research project at Yale is unusual in many ways and has been watched with interest from its inception by both the dental and medical professions. It is one of the few organized attempts to enlist medical personnel and resources in the study of dental problems and to provide a full medical training for a group of men fundamentally interested in the teeth. The program of the school does not call for the development of a training center for dentists. The aim is not to supplant dentists by physicians or to replace dental with medical education. The purpose in the first place is to increase knowledge of the teeth, their development, and the diseases to which they are subject; and, secondly, to establish a closer relationship between dentistry and medicine so that each field can benefit from the other. A small group of men are being given the opportunity to become highly skilled in dentistry and medicine in order to conduct research and to establish a link between these two related sciences.—*Science,* Feb. 22, 1935.

DISTRICT OF COLUMBIA

Medical Bills in Congress: S. 1737, introduced by Senator Frazier, North Dakota, proposes to prohibit experiments and operations on living dogs in the District of Columbia for any purpose other than the healing or curing of the dog.

IDAHO

Bills Introduced: H. 72, to supplement the pharmacy practice act, proposes a list of drugs, which it denominates as poisons. The bill proposes to make it unlawful for anyone to sell any drug so listed without first ascertaining that the purchaser is aware of the poisonous character of the drug and that it is desired for a lawful purpose, without labeling the container with the word "poison" and the name and place of business of the dispenser. It proposes also to make the sale of such a drug unlawful to a minor under 16 years of age without the written order of an adult, and, in the case of certain drugs, to require that the vender record in a book kept for that purpose the name of the drug sold, the intended use thereof, the date of delivery, the name and address of the purchaser and the name of the dispenser. The provisions of the bill are not to apply to drugs dispensed in accordance with written prescriptions of licensed physicians, dentists or veterinarians.

ILLINOIS

Bill Introduced: H. 96 proposes to impose a tax of 10 per cent of the gross cash receipts from sales in Illinois on persons manufacturing patent and proprietary medicines in the state.

Midwinter Clinic of the Chicago Dental Society: The Chicago Dental Society Midwinter clinic was held February 18-21 with a record breaking attendance. February 19, Rexford G. Tugwell addressed the meeting on "The Problem of Social Insecurity." Other important subjects were presented in part as follows: "Medical and Dental Relationships," by B. B. McCollum, D.D. S.; "The Relationship Between Dental and Medical Education," by L. E. Blauch, Ph. D.; "Cardiac Diseases and the Dentist," by Bayard Holmes, M.D.; "Factors Influencing Resistance to Infection," by R. W. Keeton, M.D.; "Relation of Endocrine Disorders to Dental Disease," by J. H. Hutton, M.D.; "Oral Pathology, Adamantine Carcinoma and Dentigerous Cyst," by Joseph Colt Bloodgood, M.D.; "Hemophilia and Other Blood Dyscrasias," by Carroll L. Birch, M.D.; "Oral Diseases in Children," by Clifford G. Grulee, M.D.; "Dental Phases of Orthopedic Diseases," by F. A. Chandler, M.D.

IOWA

Bill Introduced: H. 78 proposes that before any applicant for a license to practice medicine, osteopathy and surgery or chiropractic may be examined by his professional board, he must pass an examination to be given by an impartial basic science examining board in anatomy, physiology, chemistry, pathology, bacteriology and hygiene. This board is to consist of five members of the faculties of the state university, the Iowa State College of Agriculture and Mechanic Arts, the Iowa State Teachers College and any other university or college

accredited by the Iowa State Board of Educational Examiners. All members of the board must be learned in the basic sciences, and no member may be licensed to practice any of the healing arts.

KANSAS

University of Kansas Gets Contribution: A graduate of the University of Kansas who wishes to remain anonymous has contributed $60,000 to be used for a children's clinic. Members of the faculty are now working on plans for the new structure.

LOUISIANA

Appointments to Faculty: Six New Orleans dentists have been appointed to the faculty of the new Louisiana State University School of Dentistry, which will begin operations in September. S. H. McAfee has been named dean. Other appointees announced by the president, J. M. Smith, as department heads are: J. P. Wahl, M. B. Varnado, J. M. Woodward and W. J. Healey. According to the president, preparations for 100 first year students will be made, and these students must have had two years of college training. A new building is to be constructed adjacent to the Louisiana State University Medical Center. The plans will include a clinic of eighty chairs, which will serve the Charity Hospital as well as the dental school. Under the same roof will be the school of dentistry, school of pharmacy, graduate school of medicine and school of nursing education.

MASSACHUSETTS

Massachusetts State Board: During the past year, there has been one new appointment to the board of dental examiners. M. Francis Hinds, of New Bedford, takes the place of W. Henry Grant, of Boston, whose term expired and who, by virtue of the tenure of office, is not eligible to reappointment.

MINNESOTA

Bills Introduced: S. 177 proposes to provide for the licensing of dental hygienists by the board of dental examiners. A dental hygienist is to be authorized to remove lime deposits, accretions and stains from the exposed surfaces of the teeth, administer gas, ether and general anesthesia and to make instrumental examination of the teeth or cavities. A dental hygienist must operate (1) in the office of a licensed dentist and at all times under his direct supervision or (2) in a public institution or school which is at all times under the general supervision of a licensed dentist.

MISSOURI

Bill Introduced: S. 28 proposes to make it unlawful for any person to cultivate, cure, prepare or distribute in any manner or possess marijuana. Physicians, dentists and osteopaths are to be permitted to prescribe marijuana.

MONTANA

New Dental Law: Montana has a new dental law modeled after the Oregon dental law. It was passed by the House 86-13 and the Senate 44-3 and signed by the Governor and is now in operation.

NEW HAMPSHIRE

Bill Introduced: H. 196 proposes to limit the administration of anesthetics to licensed physicians and dentists. It proposes also to prohibit the administering of an anesthetic unless a responsible adult third person is present at the administration and during the period the patient is under the anesthetic.

NEW JERSEY

State Board News: The State Board of Registration and Examination in Dentistry has revoked the license of William Levine of Jersey City for violating the laws of this State governing dental advertising. Revocation was stayed when Chief Justice Brogan allowed a writ to review the action of the board. Arguments have been filed in the supreme court for reversing the action of the board. Dr. Levine, through his counsel, William H. Speer, questions the constitutionality of that part of the law governing the practice of dentistry under which the dental board find justification for revoking his license.

NEW YORK

Eastman Memorial Lectures: A series

of lectures has been inaugurated at the School of Medicine and Dentistry of the University of Rochester, to be known as the Eastman memorial lectures, in memory of George Eastman. February 5, Peyton Rous lectured on "Viruses and Tumors."

Dr. Brady Silenced: William A. Brady, columnist for the *Brooklyn Eagle,* has been restrained by the management of that paper from calumniating dentists in his column. He classified them with spectacle fitters, etc., who call themselves "doctor." He would deny them that title. The president of the dental society appealed to the managing editor, and Dr. Brady was silenced.

OHIO

Inventor of Anesthetic Machine Dies: Elmer I. McKesson, M.D., Toledo, known for his invention of gas anesthetic appliance machines, died recently at the age of 53. Dr. McKesson was a past president of the International Anesthetists' society. His inventions are used in every civilized country.

OREGON

Bill Introduced: H. 208 proposes to prohibit the distribution of amytal, luminal, veronal, barbital, acid diethylbarbituric or any preparation or compound containing any of the foregoing substances, except on the prescription of a licensed physician, dentist or veterinary surgeon.

PENNSYLVANIA

Bill Introduced: H. 188 proposes to establish a system of compulsory health insurance in favor of all persons engaged in manual labor and all other employed persons earning $50 a month or less. The proposed benefits, in case of illness or accident, consist of necessary medical, surgical, dental, nursing and hospital attendance and treatment, available alike to the employed person and to the dependent members of his family.

TENNESSEE

Bill Enacted: S. 97 has become a law providing that the board of health shall consist of nine members, appointed by the governor, of whom six shall be licensed practitioners of medicine, one a licensed dentist, one a licensed pharmacist and one a member of the Tennessee congress of parents and teachers and the Tennessee Federation of Women's Clubs. The medical members are to be appointed from a list of names submitted by the Tennessee State Medical Association. The board is to formulate the policies and supervise the activities of the department of public health.

DEATHS

Crossman, Victor W., Brooklyn, N. Y.; New York University College of Dentistry, 1908; died January 7; aged 61.

Herzberg, Edwin I., Chicago, Ill.; Chicago College of Dental Surgery, 1914; died January 25; aged 41.

Merwin, Robert E., Brooklyn, N. Y.; New York University College of Dentistry, 1891; died December 29.

Poole, William E., Kirkwood, Mo.; Washington University Dental College, 1914; died December 29; aged 48.

Scheer, Conrad, Tinley Park, Ill.; Northwestern University Dental School, 1894; died February 28; aged 62.

MISCELLANY

BOOK REVIEWS

Diseases of the Mouth and Their Treatment. By Hermann Prinz and Sigmund S. Greenbaum. Published by Lea and Febiger, Philadelphia. Price, $9.

This book contains 602 pages and 287 illustrations. The authors are well known in both dentistry and medicine, which assures thoroughness and dependability from the beginning. The purpose of the book is

to give a text usable to both dentist and physician. It combines the classroom and clinical experience of many years. The book is rich in reference, the subject matter is well arranged and the text is readable and clear. Its analysis and comprehensiveness and its well organized table of contents and complete index make it a valuable contribution to dental literature.

T.

Testing Precious Metals. By C. M. Hoke. Published by the Jewelers Technical Advice Co., New York City. Price, $1.

This book instructs in the determination of metals in jewelry, watches and dental golds and their carats or quantities. It is intended for persons who buy, sell, work or admire the precious metals. It gives methods for determining the constituents of the white golds, the platinums, silver and stainless steel. One chapter treats of the evolution of an industry; another the evolution of a metal dealer. The United States Government Regulations are also given. A list of the common alloys with their components is included. The manager of the company says: "Frankly, the dentists themselves . . . need educating in methods of identifying precious metals"—a dubious bit of sales talk. It is an interesting and useful book and lends itself to a rapid acquirement of the necessary technic for assaying the precious metals, but to the dentist would scarcely serve beyond the need of supplying a hobby.

T.

Studies in the Aetiology of Dental Caries. By G. Graham Macphie. Published by John Bale, Sons & Danielsson, Ltd., 83-91 Great Titchfield Street, W. 1. Price 7/6.

This book is the first to sum up the theories and facts pertinent to the subject in years. This the author does with considerable thoroughness and evidently at the expense of much labor. He handles his theme under the following heads: prevalence of caries, definition of dental caries, theories of the cause of dental caries, in which he treats internal origin, chemico-parasitic, heredity, calcium and phosphorus, vitamins, milk; diet, physical factors, tooth structure, saliva, bacteria and immunologic reactions in dental caries. Definitions of caries in large numbers are given and distinctions drawn between true caries and caries that might have another name, which is not given. "Devitalized" and "dead" teeth are defined. These things appear in the definitions. The heading "internal origin" scarcely depicts what the chapter contains. Writers are quoted who have believed that caries may have such an origin, but the author does not believe it himself. All through the book, fanciful depositions are quoted and scientific knowledge pitted against them. Similarly, the structure of enamel is presented, the pros and cons of a possible circulation. The varied and contradictory suppositions and half proofs of dietetic, bacterial and hereditary influence with immunologic experiments are recorded with completeness. The volume is a source book of comment on the etiology of caries as well as a who's who among the workers—a handy, interesting volume and easy to read.

T.

CORRESPONDENCE

Pyorrhea

To the Editor: The excellent and timely editorial on pyorrhea in the February issue of The Journal prompts the following comment on the treatment of this condition:

1. The "prevention" of pyorrhea is the ideal treatment. This includes good dental work, regular prophylactic care and correct home care. Cooperation is, in too many cases, sadly neglected, and we have the disease to cure instead of prevent.

2. Pyorrhea can be cured by the dentist (unless the teeth have reached the hopelessly advanced and loosened stage.)

3. Pyorrhea can be "kept cured" by the patient if he includes both daily home care and regular return for thorough prophylactic care every four to eight months, according to the individual case.

4. The only treatment for pyorrhea is "instrumentation." Strong drugs and medicinal remedies are absolutely contraindicated and should be given no consideration

whatever. The sooner we get the "drug idea" out of our minds, the better. We may of course use mild antiseptic washes after instrumentation and curettement for the comfort it affords the patient.

5. Surgical treatment is the logical one, but the surgical treatment of pyorrhea as generally described in the literature is too radical, for the following reasons:

(*a*) It is not necessary to cut away the gum to the depth of the pyorrhea pocket or the level of the alveolar bone. Only a narrow edge of the gum need be trimmed away. The overlying gum tissue may then be laid back and the inner surface of the pocket be thoroughly curetted to the depth of the alveolar process. The presence of this gum above the level of bone will then aid in the healing process and a better gum regeneration be encouraged; less exposure of root surfaces resulting from the treatment.

(*b*) It is not necessary to curet any "roughened" or "necrotic" bone at the alveolar crest, as is always advocated. The presence of necrotic bone under the pyorrhea pocket has never been demonstrated. The widespread use of such radical procedures as the curetting away of areas of already deficient bone around teeth affected by pyorrhea is unwarranted and distinctly contraindicated.

6. The scaling of the tooth roots and the curettement of the ulcerated inner surface of the pyorrhea pocket and the infected granulations down to the edge of the alveolar process are necessary for elimination of the disease, but to go beyond this is inexcusable. Correction of occlusion and any faulty dental work and a general physical check-up are, of course, a part of the treatment.

7. Correction of diet and diet reenforcement is always advisable after curettement. The administration of additional quantities of vitamins A and D, and calcium and phosphorus will further the remineralization of the demineralized bone at the resorbed alveolar crests. It will also remineralize the teeth and prevent sensitiveness at the necks and also raise their resistance to tooth decay.

8. The dentist must carefully teach the patient the proper use of the toothbrush and dental floss. The rubber interdental stimulator is also given the patient so he may easily and properly massage and stimulate the interdental spaces, both lingually and buccally. The dentist must be thorough and enthusiastic in his follow-up care of the case and not lose interest or permit the patient to lose interest as soon as the case has healed.

9. A thorough postgraduate course of at least four weeks is necessary before one is qualified to start the practice of periodontia. Too many men buy a set of pyorrhea surgery instruments and start "cutting gums," with only a hazy and confused idea of just what they are doing. I can assure the uninitiated that they are due for much unnecessary trouble.

10. The treatment of pyorrhea affords the dental profession a chance to render a real and needed service to their patients. The proper "preservation of the teeth and health" of our patients cannot possibly be accomplished unless we as a profession awaken to our responsibility and give more study and proper treatment to this prevalent condition.

H. A. Sebald, D.D.S.,
404 Castell Building,
Middletown, Ohio.

"IMMUNIZE NOW!"

For the twelfth time, May Day will be observed nationally as Child Health Day. The prevention of diphtheria is the keynote of this year's celebration.

A great national calamity occurred last year. Unlike the burning of the Morro Castle or the drought which devastated so many states, it did not stare at us from headlines of the papers. This calamity was the death—the unnecessary death—of about 5,000 children. Public health workers knew about it; statisticians knew about it, and of course the stricken families knew and grieved. But the general public went about its business quite unaware of what had happened.

These children died of diphtheria, and the sad thing about it is that they need never

have taken the disease. There is a way, an easy and harmless way, of protecting children from diphtheria, but these children had not been protected. What was the reason?

Experience shows that, generally, the fault lies with the parents. Children go unprotected because their parents put off taking them to the doctor or to the clinic to be immunized. Sometimes parents do not understand the importance of doing so, but more often they simply put it off. Perhaps they have never personally known of a case of diphtheria, and do not think of their own child as being in danger. Probably they have not heard of the 5,000 children who died last year, or of the probably 60,000 other children who struggled through the painful experience of diphtheria back to health—or partial health.

Few parents realize that most children are exposed to diphtheria at one time or another. Even if a child never comes in contact with an actual case, he may at any time meet and play with another child, or adult, who is carrying the germs of diphtheria about in his throat, though not sick himself. These "carriers" are numerous, and are a source of infection to other people, especially to children, who are more susceptible to the disease than are adults.

Diphtheria is a serious disease at any age, but it is most serious to young children. A very young child is not only more likely to contract diphtheria, but also he is more likely to die of it than is an older child. The first four years of life show the greatest number of deaths, more than half of all deaths from this disease in the United States.

A baby up to about 6 months of age has in most cases a natural immunity. After the natural immunity wears off, and up to about 3 years of age, practically every child is susceptible to diphtheria. This, then, is the period of greatest danger, though cases are frequent up to 15 years of age. After that, the number of cases drops off sharply.

Fortunately, no child need have diphtheria. We know exactly how to prevent it. There is a treatment which has been perfected so that it does not make the child sick, but it does remove the risk of his taking the disease. And the time to give this treatment is before the baby is a year old.

The treatment itself is very simple. It consists of injecting under the skin of the arm one or more doses of a harmless preparation which stimulates the body to build up its own protection against any diphtheria germs that may find their way into the nose or throat. This process is called "immunization." The treatment must have time to do its work. It will be several months before the child is completely protected. Consequently, to wait until there are diphtheria cases in the neighborhood is to wait too long.

Children do not all react in precisely the same way to this immunizing treatment. Occasionally, there is a child who is not so easily protected as most children. For this reason, at the end of six months or more after the treatment, most doctors like to give a skin test, called the Schick test, which shows very definitely whether the immunization is complete. In the very few cases where it is found not to be so, the doctor gives another injection.

Diphtheria has been called "the vanishing disease," thanks to immunization! In the twelve years from 1920 to 1932, the deaths from diphtheria in the United States dropped from 15 for every 100,000 population to 4.5. This was a remarkable record. Yet, though diphtheria may be vanishing, it has not vanished, and will not vanish without continued effort on our part. Where interest dies down, where parents grow careless about seeking protection for their children, diphtheria creeps up again. Though there are states and cities where the disease has become very rare, there are other states and cities where the trend is in the wrong direction; where the deaths, according to the latest reliable figures, are increasing rather than decreasing.

For this reason, the stamping out of diphtheria has been chosen as the special project for May Day-Child Health Day this year. Its success depends on a joint effort of public health officials, private physicians and parents. Given this community spirit, there is no reason that the goal of

"no deaths from diphtheria" should not be attained. It has been attained in certain localities. The diphtheria ward of the Alexandra Hospital in Montreal, for example, has closed its doors because there are not enough patients to warrant its remaining open. To turn to our own country, there were two cities of over 50,000 inhabitants in the state of New York which did not have a single case of diphtheria in 1934, as well as three cities of between 25,000 and 50,000 inhabitants, and thirty-six smaller cities. This is proof enough that diphtheria can be stamped out.

There is a public as well as a private duty in this, for every child immunized adds so much to the protection of other children, since it makes an epidemic less likely. As a neighborly act, therefore, as well as for the safety of your own family, see that your children all receive the protective treatment. "All for one and one for all" is the spirit which will win. Do your part. *Immunize now,* and stamp out diphtheria!

ANNOUNCEMENTS*

CALENDAR OF MEETINGS

American Dental Association, New Orleans, La., November 4-8.

American Dental Society of Europe, London, July 31-August 3.

American Society of Orthodontists, New York City, April 30-May 3.

Belgian National Dental Congress, Brussels, August.

Dental Alumni Association, American University of Beirut, Beirut, Lebanon, June.

Eastern Association of Graduates of Angle School of Orthodontia, New York City, May 3.

International Congress of Stomatology, Bologna, April 14-19.

International Dental Congress, Vienna, Aug. 2-9, 1936.

National Board of Dental Examiners, May 24-25.

New York Society of Orthodontists, New York City, April 30-May 3.

New York State Dental Hygienists Association, Saranac, June 12-15.

Northern Ohio Dental Association, Cedar Lake, June 17-18.

Ontario Dental Association, Toronto, May 20-22.

Philadelphia Dental College and Dental School, Temple University Alumni Society, Philadelphia, June 11-12.

American Dental Assistants Association, New Orleans, November 4-8.

Society for the Advancement of General Anesthesia in Dentistry, New York City, third Monday in February, April, October and December.

District of Columbia at George Washington University, Washington, D. C., second and fourth Tuesdays in each month from October to June, inclusive.

STATE SOCIETIES

April

Alabama, at Birmingham (16-18)
California, at Oakland (8-10)
Kansas, at Wichita (22-24)
Kentucky, at Paducah (1-3)
Louisiana, at New Orleans (18-20)
Massachusetts, at Boston (29-May 2)
Michigan, at Detroit (22-24)
Mississippi, at Jackson (22-24)
New Jersey, at Atlantic City (24-25)
Texas, at Waco (15-18)
Wisconsin, at Milwaukee (16-18)

May

Arkansas, at Little Rock (13-15)
Connecticut, at Waterbury (8-10)

*Announcements must be received by the fifth day of the month in order to be published in the forthcoming issue of THE JOURNAL.

Georgia, at Atlanta (13-15)
Illinois, at Quincy (14-16)
Indiana, at Indianapolis (20-22)
Iowa, at Des Moines (7-9)
Maryland, at Baltimore (6-8)
Montana, at Lewiston (9-11)
Nebraska, at Omaha (20-23)
Pennsylvania, at Altoona (7-9)
South Dakota, at Huron (13-14)
Tennessee, at Nashville (14-16)
Vermont, at Burlington (15-17)
West Virginia, at Parkersburg (20-22)

June

Maine, at Augusta (21-22)
New Hampshire, at Rye Beach (26-27)
New York, at Upper Saranac Lake (12-15)
North Carolina, at Blowing Rock (17-19)
Oregon, at Portland (5-8)

July

Southern California, at Long Beach (8-12)
Virginia, at Hot Springs (1-3)

November

Louisiana, at New Orleans (4-8)

STATE BOARDS OF DENTAL EXAMINERS

Alabama, at Birmingham, June 24. E. W. Patton, 1807 Comer Bldg., Birmingham, Secretary.

Arkansas, at Little Rock, June 17-20. Clarence W. Koch, 817 Donaghey Bldg., Secretary.

California, at San Francisco, May 27; Los Angeles, June 24. Kenneth I. Nesbitt, 450 McAllister St., San Francisco, Secretary.

Connecticut, at Hartford, June 26-29. Almond J. Cutting, Southington, Secretary.

Florida, at Jacksonville, June 24-29. H. B. Pattishall, 351 St. James Bldg., Jacksonville, Secretary.

Georgia, May 30. R. C. Coleman, Atlanta, Joint Secretary, State Examining Boards.

Kentucky, June 11-14. Robert L. Sprau, 970 Baxter Ave., Louisville, Secretary.

Indiana, at Indianapolis, June 18-21. J. M. Hale, Mt. Vernon, Secretary.

Iowa, at Des Moines, May 27-30. Hardy F. Pool, Mason City, Secretary.

Maine, at Augusta, June 24-26. Alton H. Swett, 192 State St., Portland, Secretary.

Mississippi, at Jackson, June 18-20. T. Ford Leggett, Laurel, Secretary.

New Jersey, at Trenton, June 24-29. J. C. Forsyth, 148 W. State St., Trenton, Secretary.

North Dakota, at Fargo, June 9-12. W. E. Cole, Bismarck, Secretary.

Ohio, at Columbus, June 24. Morton H. Jones, 1553½ North Fourth St., Columbus, Secretary.

Pennsylvania, at Philadelphia and Pittsburgh, June 18-22. W. A. McCready, 1115 Highland Bldg., Pittsburgh, Secretary.

Rhode Island, at Providence, June 25-27. Albert L. Midgley, 1108 Union Trust Bldg., Providence, Secretary.

Tennessee, at Nashville, May 14-16. E. J. Justis, Exchange Bldg., Memphis, Secretary.

Texas, at Dallas, June 17-21. R. J. Weber, 1014 Norwood Bldg., Austin, Secretary.

Vermont, at Montpelier, June 24-26. H. B. Small, Burlington, Secretary.

Virginia, at Richmond, June 11. John M. Hughes, 715 Medical Arts Bldg., Richmond, Secretary.

West Virginia, at Charleston, June 24-26. H. C. Hill, Charleston, Secretary.

Wisconsin, at Milwaukee, June 17-21. S. F. Donovan, Tomah, Secretary.

BOARD OF DENTAL EXAMINERS OF ALABAMA

The Board of Dental Examiners of Alabama will conduct its next annual dental and dental hygiene examinations in Birmingham, commencing at 8:30 a.m., June 24. Failure to forward all credentials to the secretary-treasurer's office at least two weeks before the date of commencement of examinations will have the effect of barring the applicant from examination. For further information, address

E. W. PATTON, *Secretary*,
1807 Comer Bldg.,
Birmingham.

BOARD OF DENTAL EXAMINERS OF CALIFORNIA

The next examination to be conducted by the Board of Dental Examiners of California will be held in San Francisco commencing May 27, and in Los Angeles, commencing June 24. All credentials must be in the office of the secretary at least twenty days prior to either examination. For information regarding these examinations, address

KENNETH I. NESBETT, *Secretary,*
405 McAllister St.,
San Francisco.

NORTH DAKOTA STATE BOARD OF DENTAL EXAMINERS

The North Dakota State Board of Dental Examiners will conduct examinations for license in North Dakota at Fargo, June 9-12. For further information, address

W. E. COLE, *Secretary,*
Bismarck.

PENNSYLVANIA STATE BOARD OF DENTAL EXAMINERS

The Pennsylvania State Board of Dental Examiners will hold its next examinations June 18-22, at Philadelphia and Pittsburgh.

W. A. MCCREADY, *Secretary,*
1115 Highland Bldg.,
Pittsburgh.

TEXAS STATE BOARD OF DENTAL EXAMINERS

The next examination of the Texas State Board of Dental Examiners will be held in Dallas, June 17-21. There is no reciprocity. Applications must be filed at least ten days prior to the date of examination. Address all communications regarding further particulars to

R. T. WEBER, *Secretary,*
1014 Norwood Bldg.,
Austin.

VERMONT BOARD OF EXAMINERS

The Vermont State Board of Dental Examiners will meet June 24-26, in the State House, Montpelier, to examine applicants for license to practice dentistry and dental hygiene. All applications, accompanied by the examination fee, must be in the hands of the secretary at least ten days before the date of the meeting. For applications and other information, address

H. B. SMALL, *Secretary,*
Burlington.

GEORGIA STATE BOARD OF DENTAL EXAMINERS

The Georgia State Board of Dental Examiners will hold the 1935 examinations during the week of May 30.

R. C. COLEMAN, *Joint Secretary,*
State Examining Boards.

WISCONSIN STATE BOARD OF DENTAL EXAMINERS

The Wisconsin State Board of Dental Examiners will hold its next examination June 17-21, at Marquette University, College of Dentistry, Milwaukee. Applications properly executed and accompanied by proper credentials and the state fee of $25 should be in the hands of the secretary June 12.

S. F. DONOVAN, *Secretary,*
Tomah.

NORTHERN OHIO DENTAL ASSOCIATION

The Seventy-Eighth Annual Session of the Northern Ohio Dental Association will be held at Cedar Point on Lake Erie, June 17-18.

C. R. A. HOFFMAN,
Publicity Committee,
6503 Detroit Ave.,
Cleveland, Ohio.

RHODE ISLAND BOARD OF REGISTRATION IN DENTISTRY

A meeting of the Rhode Island Board of Registration in Dentistry for the examination of applicants for license to practice dentistry and dental hygiene will be held at the State House, Providence, June 25-27, beginning each day at 9 a.m. Candidates shall present to the secretary of this board, at least ten days before the examination, an application with fee and photo-

graph. For applications and further information, address

ALBERT L. MIDGLEY, *Secretary,*
1108 Union Trust Bldg.,
Providence.

PHILADELPHIA DENTAL COLLEGE AND DENTAL SCHOOL OF TEMPLE UNIVERSITY ALUMNI SOCIETY

The Seventy-Second Annual Alumni Reunion of the Philadelphia Dental College and Dental School of Temple University will be held in the professional schools building, 18th and Spring Garden streets, Philadelphia, June 11-12.

JAMES W. CRAIG, *Chairman of Publicity,*
612 Garrett Road,
Upper Darby, Pa.

EASTERN ASSOCIATION OF GRADUATES OF THE ANGLE SCHOOL OF ORTHODONTIA

The Eastern Association of Graduates of the Angle School of Orthodontia will hold an executive session during the meeting of the American Society of Orthodontists. A luncheon will be given on May 3 at 12:30 p.m. at the Waldorf Astoria Hotel, New York City.

E. SANTLEY BUTLER, *Secretary,*
576 Fifth Ave.,
New York City.

ONTARIO DENTAL ASSOCIATION

The annual convention of the Ontario Dental Association will be held at the Royal York Hotel, Toronto, May 20-22. Ethical dentists of the provinces of Canada outside of Ontario and from the United States are invited to attend as guests of the Ontario Society.

FRED J. CONBOY, *Secretary,*
86 Bloor St., West,
Toronto.

WISCONSIN STATE DENTAL HYGIENISTS' ASSOCIATION

The annual meeting of the Wisconsin State Dental Hygienists' Association will be held in Milwaukee at the Shroeder Hotel, April 17-18.

ISABELL SCHOLL,
2521 S. 30th St.,
Milwaukee.

TESTIMONIAL TO DR. OTTOLENGUI BY THE DENTAL PROFESSION

The dental profession is to express in a material sense its debt to one of the profession's most unselfish, tireless and accomplished workers. A movement has been started to recognize the seventy-fifth birthday of Dr. R. Ottolengui through the medium of a fund to be raised among his many friends and admirers in the profession. Over forty-one years an editor; author of books, both dental and fiction; contributor of chapters to several recognized textbooks on dentistry, lecturer, clinician, inventor, dental society officer, active worker in dental relief work and contributor of his time, thought and personal fortune to the advancement and for the general welfare of the profession in all of its phases, he has earned the gratitude and appreciation of all who believe that unusual service merits recognition. To those contributing $5 or more to this fund, the committee proposes to send a copy or a special edition of Dr. Ottolengui's book, "Table Talks on Dentistry," with an engraved facsimile of the author's autograph on the first page. This and the special marking of the book will identify it and always serve as a reminder of your active participation in this well earned tribute. Please mail check or money order to the Ottolengui Testimonial Fund, 1 Hanson Place, Brooklyn, N. Y. The active participation of members of the dental profession from all over the country is anticipated. "Do it now." The committee thanks you for your generous cooperation.

W. D. TRACY, *Honorary Chairman,*
J. R. SCHWARTZ, *Chairman.*

CORRECTION

At the request of the author, attention is called to an error occurring in the discussion of Dr. Rickert's paper by Dr. Blayney in the March issue of THE JOURNAL, page 428, second column. In accordance with the original manuscript, line thirty reads "F, acetylsalicylic acid (as a stimulant)." The author wishes to correct this to read: "F, acetylsalicylic acid (as an analgesic or sedative)."

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